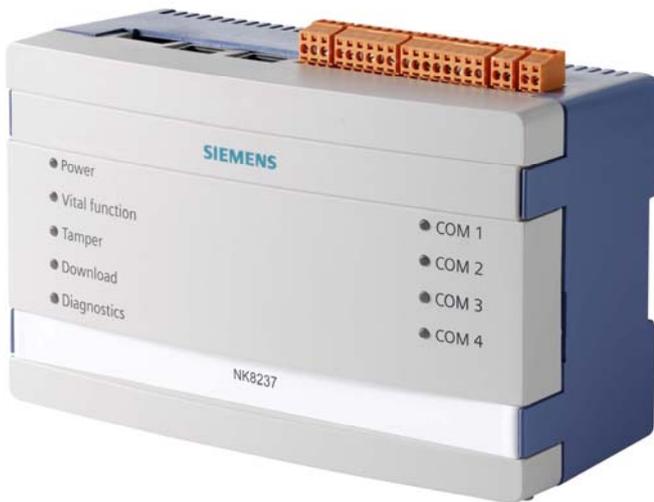


SIEMENS



NK8237 MP4.50

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

Interface Specifications

Building Technologies

Fire Safety and Security Products

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About this document

Purpose

This manual is intended as a guide to the Modbus interface provided by the NK8237 Gateway for the fire control units of FS20/FS720 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 **NK8237 MP4.50**.

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 criterias: 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 [→ 7] 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.	<ol style="list-style-type: none"> 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.	<ul style="list-style-type: none"> ● 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 ⇒.	<p>▷ The report you want to print is open.</p> <ol style="list-style-type: none"> 1. Select 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 <code>Definition successfully renamed</code> displays in the status bar.
<i>Italics</i> are used to emphasize a term.	The Open Processor continuously executes a user-defined set of instructions called the <i>control program</i> .
	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		
Current version	Date	Comments
A6V10316242_a_en	06.2012	Corresponds with MP4.50
A6V10316242_a_en	06.2011	Corresponds with MP4.40
A6V10316242_a_en	09.2010	Corresponds with MP4.30

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 become 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 NK8237 Modbus Interface Specifications

The NK8237 gateway enables Modbus master/client stations to access the FS20/FS720 fire control units for acquiring the status information.

The NK8237 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 NK8237 Modbus

2.1.1 Modbus Protocol

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.	
Modbus hosts	Detectors and units
1 Modbus host	<ul style="list-style-type: none"> ● Max. 10,000 detectors. ● 16 FS20/FS720 units in FCnet/SAFEDLINK topology or 4 units in FCnet/Ethernet topology
2 Modbus hosts	<ul style="list-style-type: none"> ● Max. 5,000 detectors. ● 8 FS20/FS720 units in FCnet/SAFEDLINK topology or 4 units in FCnet/Ethernet topology
3 Modbus hosts	<ul style="list-style-type: none"> ● Max. 3,500 detectors. ● 6 FS20/FS720 units in FCnet/SAFEDLINK topology or 4 units in FCnet/Ethernet topology
4 Modbus hosts	<ul style="list-style-type: none"> ● Max. 2,500 detectors. ● 4 FS20/FS720 units in FCnet/SAFEDLINK topology or 4 units in FCnet/Ethernet topology.

2.1.2 Modbus Functions

The NK8237 supports the following Modbus functions:

Function code	Function	Applicable NK8237 tables	Notes
0x02	Read Discrete Input	Bit Status	
0x03	Read Holding Registers	Command, Date and Time	Use it for reading date & time registers
0x04	Read Input Registers	Summary; Status; Compact Status	Use it for reading status information
0x06	Write Single Register	Command;	Use it for writing

Function code	Function	Applicable NK8237 tables	Notes
		Synchronization	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.

NK8237 Modbus functions

2.2 NK8237 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 NK8237 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 for the NK8237 can import the *FS20/FS720 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 [→ 13] 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 NK8237.

**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 NK8237 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 NK8237 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 of this field are ignored in the re-import.

ModbusSlaveAddress

Address of the Modbus slave (range: 1... 247). Modification of this fields is ignored in the re-import.

ParentDescription

Description text of the parent object. Modification of this fields is ignored in the re-import.

Description

Description text of the object. Modification of this fields is ignored in the re-import.

TechnicalText

Technical text of the object in the Composer project. Modification of this fields is 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 Register Map [→ 13]). It cannot be modified.

Modbus BaseAddress

Starting address of the set of Modbus registers associated to the object. Modification of this field is 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. Modification of this fields is 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. Modification of this fields is 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 [→ 21]).

Modifications of 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 Register Map

Data Representation

The NK8237 can support multiple fire panels or terminals (FC2xxx or FT2xxx). Each panel, terminal and the NK8237 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 as well as a general table for the NK8237 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. Namely:

 - Areas
 - Sections
 - Detection zones
 - Detection elements (logical channels)
 - Controls
 - Control elements (control channels)
 - Hardware objects
- **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 and Synchronization Tables [→ 15].

NK8237 Unit Representation

A dedicated register sub-map is used for the NK8237 unit, including one status table.

- **Status table**

This is a word input register reporting the conditions of the NK8237 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 NK8237 table is the following:

- NK8237 Points
- Power Supply

2.2.2.1 Summary and Synchronization Tables

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

FC20 synthesis

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

Bit	Information	Notes about the conditions corresponding to the "1" state (bit active)
		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
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	One or more alarms have been generated by detection components

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

Life Check

One input (read-only) word register that is constantly incremented as long as the NK8237 software works properly and the communication with the fire panel and the Modbus unit is active.

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

- The communication between NK8237 and the Modbus unit goes down (this event can be detected and treated by other Modbus units).
- The communication between NK8237 and the fire panel goes down.

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

LifeCheck (Input register, default base address: 1010)

Data Change

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

DataChange (Input registers, default base address: 1020)

Date and Time

Three holding (read/write) word registers used for reading or synchronizing the NK8237 date and time.

The synchronization must be enabled in the configuration settings and results, in turn, in the synchronization of the fire system.

Alternatively, if the synchronization on these registers is not enabled, the NK8237 gets the date and time periodically from the fire system. 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 NK8237 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

DateTime (Holding registers, default base address: 1060)

2.2.2.2 Status Tables (Fire Units)

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

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

WT_Area (Input registers, default base address: 6500)

Section

Bit	Information	Notes
0 (lsb)	Non-default mode	Abnormal mode such as higher detection sensitivity
1-3	-	Not used
4	WalkTest	Walktest active
5	-	Not used
8	Non-default value	Abnormal condition resulting in a reduced safety, for example if alarming is excluded while keeping the fault supervision on
9-15	-	Not used

WT_Section (Input registers, default base address: 6100)

Detection Zone

Bit	Information	Notes
0 (lsb)	Non-default mode	Abnormal mode condition such as higher or lower detection sensitivity
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
9-13	-	Not used
14	Pre-alarm	Pre-alarmed *
15	Alarm	Alarmed *

WT_Zone (Input registers, default base address: 1500)

* 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)

Bit	Information	Notes
0 (lsb)	Non-default mode	Abnormal mode condition
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

WT_LogCh (Input registers, default base address: 2500)

Control

Bit	Information	Notes
0 (lsb)	Non-default mode	Abnormal mode condition
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

WT_Ctrl (Input registers, default base address: 3500)

Control element (control channel)

Bit	Information	Notes
0 (lsb)	Non-default mode	Abnormal mode condition
1-5	-	Not used
6	Test	Set in test mode
7	Off	Excluded

Bit	Information	Notes
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

WT_CtrlChan (Input registers, default base address: 4800)

Hardware object

Bit	Information	Notes
0 (lsb)	Non-default mode	Abnormal mode condition
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

WT_HWObj (Input registers, default base address: 6601)

Power Supply

Bit	Information	Notes
0 (lsb)	Non-default mode	Currently note used (foreseen for future extensions)
1-7	-	Not used
8	Non-default value	Currently note 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

WT_PowerSupply (Input register, default base address: 6600)

2.2.2.3 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)

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 *
3	Alarm	Alarmed *

CT_Zone (Input registers, default base address: 8100)

* 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)

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

CT_LogChan (Input registers, default base address: 9000)

2.2.2.4 Bit Status Tables

The bit status tables 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 *	Detection zones	21000
BT_ZonePreAlarm	Detection zone pre-alarmed *	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	Detection elements	11000

Table	Information	Related object type	Default base address
	channel) faulty		
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_CtrlINDV&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_PowerSupplyEmerPower	Power supply emergency power	Power supply battery	33000

Bit Status Tables (Input registers)

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

2.2.2.5 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

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

CMDT_FC20 (Holding register, default base address 25000)

Area manned/unmanned: set day or night mode

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

CMDT_Area (Holding register, default base address 31000)

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

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

CMDT_Section (Holding register, default base address 30000)

Detection zone on/off: include/exclude the zone

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

CMDT_Zone (Holding register, default base address 26000)

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

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

CMDT_LogChan (Holding register, default base address 27000)

Control on/off: include/exclude the actuation group

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

CMDT_Ctrl (Holding register, default base address 28000)

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

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

CMDT_CtrlChan (Holding register, default base address 29000)

2.2.2.6 Status Tables (NK8237 Unit)

The NK8237 status tables include two types of input word registers applied to a number of objects.

NK8237 Points

This table is applied to six objects:

- NK8237 Status
- NK8237 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 NK8237 and fire system Note: this information is only available on the NK8237 status register.
10-14		
15	Alarm	Activated / Alarmed / Tamper Note: this information is available on the Tamper, Input and Output registers.

WT_NK8237Point (Input registers, default base address: 8000)

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	Register
DateTime	1060	Holding register
DataChange	1020	Input register
LifeCheck	1010	Input register
WT_FC20 Syn	1000	Input register
WT_Zone	1500	Input register
WT_LogChan	2500	Input register
WT_Ctrl	3500	Input register
WT_CtrlChan	4800	Input register
WT_Section	6100	Input register
WT_Area	6500	Input register
WT_HWObj	6601	Input register
WT_NK8237Point	8000	Input register
WT_PowerSupply	6600	Input register
CT_Zone	8100	Input register
CT_LogCh	9000	Input register
BT_ZoneAlarm	21000	Discrete input
BT_ZonePreAlarm	22000	Discrete input
BT_ZoneNDV&NotReady	23000	Discrete input
BT_ZoneModeOff&Test	24000	Discrete input
BT_LogChanActive	10000	Discrete input
BT_LogChanNDV&Fault	11000	Discrete input
BT_LogChanModeOff&Test	12000	Discrete input
BT_CtrlAlarm&Active	13000	Discrete input
BT_CtrlNDV&Fault	14000	Discrete input
BT_CtrlModeOff&Test	15000	Discrete input
BT_CtrlChanActive	16000	Discrete input

Modbus Table	Modbus Base Address	Register
BT_CtrlChanFault	17000	Discrete input
BT_CtrlChanModeOff&Test	18000	Discrete input
BT_HWObjAlarm	19000	Discrete input
BT_HWObjFault	20000	Discrete input
BT_PowerSupply	32000	Discrete input
BT_EmergencyPower	33000	Discrete input
CMDT_FC20	25000	Holding register
CMDT_Zone	26000	Holding register
CMDT_LogChan	27000	Holding register
CMDT_Ctrl	28000	Holding register
CMDT_CtrlChan	29000	Holding register
CMDT_Section	30000	Holding register
CMDT_Area	31000	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.

2.2.3 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 [→ 13]).

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

WT_FC20

Sinteso™ FS20:

- FC2020
- FC2030
- FC2040
- FC2060
- FT20

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; ChannelPhysSensorP2GasElem)
- ByPassable Input (ChannelLogInputAaConfirmationElem; ChannelLogInputAaFaultElem; ChannelLogInputAaSupervisionElem; ChannelLogInputFireElem; ChannelLogInputSprinklerElem; ChannelLogEvacElem; ChannelLogInputSprinkler1Elem; ChannelLogInputSprinkler2Elem)
- Non Bypassable Input (ChannelLogInputBlockedElem; ChannelLogInputDischargedElem; 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

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)

2.2.4 NK8237 Objects

This section lists the NK8237 gateway objects and the corresponding types in the NK8237 Modbus data model (refer to the Register Map section [→ 13]).

WT_NK8237Point

- Application node (NK8237 status)
- NK8237 unit tamper
- Digital Input Onboard (power supply supervision or generic inputs)
- Digital Output Onboard (Modbus communication fault)

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