

## AKO-57624      AKO-576410      AKO-576032

### MODBUS map in AKOGas gas detectors

## Introducción

This document is aimed at describing to the user the operation of the MODBUS RTU communications series protocol implemented by AKO in the AKOGas detectors. We should take into account that we assume that the user who wants to interact with any of our equipment with communication capacity has some knowledge of the protocol.



**IMPORTANT:** The functions and parameters described below are available depending on the chosen unit, for more information consult the device's user manual.

## Technical specifications

### RS-485 communications

Physically speaking, the AKOGas devices can be connected to a RS-485 communications bus with other units. This is a multipoint connection where the maximum distance is 1200\* m. The configuration of this bus should be identical to the one presented in the following table:

RS-485 SERIES CONFIGURATION	
Baud Rate	9600**, 19200, 38400, 57600
Data length	8 bits
Parity bit	No
Stop Bits	1 bit

### Modbus protocol

The protocol defines a network configuration where a network manager device (master) coexists with one or several slaves, up to a maximum of 32 networked devices (247 in the case of placing repeaters in the RS-485 network).

Among the two transmission modes defined by the protocol: ASCII and RTU (Remote Terminal Unit), AKO adopts the RTU mode. It must be said that in a network of devices connected via the MODBUS protocol, devices cannot be shared using different transmission modes.

The datagram format in RTU format is:

Start frame	Address	Function	Data	CRC	End frame
3.5T	1 byte (1 to 247)	1 integer	Max. 126 integers	1 integer	3.5T

←————— Maximum length 255 bytes —————→

The maximum data unit is the integer (2 bytes)

T is the time of transition of one character.

## Defined MODBUS functions

AKO solves the management of its devices using several basic functions of the MODBUS protocol:

Function	Definition	Description of operation
03	Read holding registers	Reading of multiple logs
06	Preset single registers	Writing a log
16	Preset multiple registers	Writing of multiple logs

## Definitions

Types of log	
N	Numeric value.
Nx10	Numeric value multiplied by 10, it has to be divided by 10 to represent it correctly.
Nx100	Numeric value multiplied by 100, it has to be divided by 100 to represent it correctly.
UTF8	2 bytes utf8 (to represent texts)
BITS	Bit map, each bit represents a value, 0 = not active, 1 = active.
Types of access	
R	Read-only. (Parameters to display to the user in the parameter section)
W	Read and write. (Parameters to display to the user in the parameter section)

\* Maximum distance at 9600 baud, the distance is reduced on increasing the baud rate.

\*\*Default value.

## Parameters

It allows the user to display and edit the operating parameters.

### Alarm configuration

Register	Type	Access	Parameter	Description	Range	Min.	Def.	Max.
200	N	R	AL2	Pre-Alarm	<b>0:</b> Disabled <b>1:</b> Enabled	0	Acc. jumper	1
201	N	R	AL3	Pre-alarm level (1 <sup>st</sup> levels set)	<b>AKO-57624</b> <b>AKO-576410</b> <b>AKO-576032</b>	0 - 2000	0	1000 500 500 2000
202	N	W	AL4	Pre-Alarm Differential	10 - 200	10	100	200
203	N	W	AL5	Pre-Alarm Delay	<b>0:</b> According switch <b>1:</b> 0 s. <b>2:</b> 30 s <b>3:</b> 60 s <b>4:</b> 180 s	0	0	4
204	N	R	AL6	Alarm levels (1 <sup>st</sup> levels set)	<b>AKO-57624</b> <b>AKO-576410</b> <b>AKO-576032</b>	0 - 2000	0	1500 1000 1000 2000
205	N	W	AL7	Alarm Differential	0 - 200	0	100	200
207	N	W	AL9	Pre-alarm level (2 <sup>on</sup> levels set)	<b>AKO-57624</b> <b>AKO-576410</b> <b>AKO-576032</b>	0 - 5000	0	2000 1500 1000 5000
208	N	W	AL10	Alarm level (2 <sup>on</sup> levels set)	<b>AKO-57624</b> <b>AKO-576410</b> <b>AKO-576032</b>	0 - 9999	0	4000 3000 2000 9999
209	N	R	AL11	Levels set selection	<b>0:</b> According switch <b>1:</b> 1 <sup>st</sup> levels set <b>2:</b> 2 <sup>on</sup> levels set	0	0	2

### Basic configuration

Register	Type	Access	Parameter	Description	Range	Min.	Def.	Max.
300	N	R	Gc1	Sensor type	<b>2:</b> Type B <b>3:</b> Type C <b>4:</b> Type A/U <b>6:</b> HFO	2	Acc. model	6
301	N	W	b03	Function of the mute key	<b>0:</b> Disabled <b>1:</b> Deactivate acoustic alarm <b>2:</b> Deactivate relay <b>3:</b> Deactivate both	0	1	3
302	N	W	b04	Acoustic alarm	<b>0:</b> Disabled; <b>1:</b> Enabled	0	1	1
303	N	W	b20	MODBUS address	1 - 255	1	1	255
304	N	W	b21	MODBUS Communication speed	<b>0:</b> 9600 bps <b>1:</b> 19200 bps <b>2:</b> 38400 bps <b>3:</b> 57600 bps	0	0	3

### Information

Register	Type	Access	Parameter	Description	Range	Min.	Def.	Max.
801	N	R	PU	Program version	-	-	-	-
802	N	R	Pr	Program revision	-	-	-	-
803	N	R	bU	Bootloader version	-	-	-	-
804	N	R	br	Bootloader revision	-	-	-	-
805	N	R	PAr	Parameter map version	-	-	-	-

## Unit status

Allows the user to consult the status of the unit.

### Alarms

Register	Type	Access	Description	Values
1547	BITS	R	Active alarms Bit 0 = Pre-Alarm Bit 1 = Alarm Bit 2 = Sensor error Bit 3 = Low temperature sensor error Bit 4 = High temperature sensor error	0 = Inactive; 1 = Active
1548	BITS	R	Alarms saved and not confirmed Bit 0 = Pre-Alarm Bit 1 = Alarm Bit 2 = Sensor error Bit 3 = Low temperature sensor error Bit 4 = High temperature sensor error	0 = Inactive; 1 = Active
1549	BITS	R	Silenced alarms Bit 0 = Pre-Alarm Bit 1 = Alarm Bit 2 = Sensor error Bit 3 = Low temperature sensor error Bit 4 = High temperature sensor error	0 = Inactive; 1 = Active
1550	BITS	R	Maintenance Mode	0 = Inactive; 1 = Active
1551	BITS	R	Set Hold mode	0 = Inactive; 1 = Active

### Reading of inputs and outputs

Register	Type	Access	Description	Values
1000	N	R	Alarm relay status	0 = Inactive; 1 = Active
1002	N	R	Acoustic alarm status	0 = Inactive; 1 = Active
1005	N	R	4/20 mA output (current value in microamps)	
1007	Nx10	R	Sensor temperature in tenths of a degree	
1008	N	R	Jumper status	0 = Disconnected 1 = Connected
1009	Bits	R	Microswitch status	Bit 0: Alarm delay Bit 1: Alarm levels set selection

### Keyboard

Register	Type	Access	Description	Values
20000	BITS	W	Activation of functions Bit 0 = Activation of the Mute function Bit 1 = Activation of the Set Hold mode	0 = Inactive; 1 = Active
20001	BITS	R	Function status Bit 0 = Activation of the Mute function Bit 1 = Activation of the Set Hold mode	0 = Inactive; 1 = Active

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