R&D FIRE DEPARTMENT

FA100 - Modbus TCP support

Technical Specification

Rev. 1.00

DATE: 22/11/2024

Summary

1. Revision History

DOCUMENT DETAILS	
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Distribution:	RESERVED – CONFIDENTIAL

VERSION	DATE	DESCRIPTION
1.00	22/11/2024	First issue

2. Modbus TCP

The Modbus TCP protocol is supported by FA100 (firmware version 1.00.01.00 or later) exclusively via the Ethernet interface (FA100LAN).
The Modbus TCP support can be enabled from FA Studio software via a dedicated option in the LAN network section (this option is disabled by default).

2.1. Input Registers

The following registers can be read with Read Input Registers function code (04).

Register	Addr.	Byte	Bit	Description
Device status	0	High	7..1	Future use
			0	Service mode
		Low	7	Corrupted data programming
			6	Firmware update fault
			5	Primary supply fault
			4	Auxiliary supply fault
			3	Blower fault
			2	Loop is not responding
			1	Loop isolator open
			0	Interconnection fault
Primary supply voltage	1			Power supply value. To obtain the measurement expressed in Volt, divide this value by 2240.
Auxiliary supply voltage	2			Auxiliary supply value. To obtain the measurement expressed in Volt, divide this value by 2240.
Bower speed	3			Blower speed expressed in RPM
Reserved	4..7			Future use
Detector 1 – Status	8	High	7..4	Future use
			3	Detector bypassed
			2	Temperature event, it indicates that air temperature has surpassed a programmed threshold
			1	Flowmeter fault
			0	Low flowrate fault (blockage)

Register	Addr.	Byte	Bit	Description
		Low	7	High flowrate fault (broken pipe)
			6	Contamination fault
			5	Optics fault
			4	Not responding detector
			3	Detector not present
			2	Custom event, it indicates if the smoke level exceeded the custom threshold
			1	Warning, it indicates if the smoke level exceeded the warning threshold
			0	Alarm, it indicates the smoke level exceeded the alarm threshold
Detector 1 – Sensitivity	9			Detector sensitivity; range 235 .. 20000 expressed in 10^{-5} dB/m.
Detector 1 – Smoke level / Reliability	10	High – Smoke level		Percentage of obscuration level (0% .. 255%). 100% corresponds to reaching the alarm threshold.
		Low – Reliability		Reliability level, range 0 .. 200 where 0 represents the highest probability of a false alarm, and 200 represents the highest probability of a fire.
Detector 1 – Contamination / Temperature	11	High – Contamination		Contamination level of the detector chamber, represented as a percentage (0% .. 100%)
		Low – Temperature		Air temperature. The range -128 .. + 127 corresponds to -64 °C .. +63.5 °C. Resolution 0.5°C.
Detector 1 – Current flowrate	12			Current measure of air flowrate. The range 0 .. 65535 corresponds to 0 .. 655.35 l/min. Resolution 0.01 l/min.
Detector 1 – Nominal flowrate	13			Nominal air flowrate. The range 0 .. 65535 corresponds to 0 .. 655.35 l/min. Resolution 0.01 l/min.
Reserved	14..15			Future use

Register	Addr.	Byte	Bit	Description
Detector 2 – Status	16			See Detector 1 – Status
Detector 2 – Sensitivity	17			See Detector 1 – Sensitivity
Detector 2 – Smoke level / Reliability	18			See Detector 1 – Smoke level / Reliability
Detector 2 – Contamination / Temperature	19			See Detector 1 – Contamination / Temperature
Detector 2 – Current flowrate	20			See Detector 1 – Current flowrate
Detector 2 – Nominal flowrate	21			See Detector 1 – Nominal flowrate
Reserved	22..23			Future use

Register	Addr.	Byte	Bit	Description
I/O 1..2 status	24	High – I/O2	7	Input reference: 0 = Positive reference, 1 = Negative reference
			6	Polarity: 0 = Normally closed, 1 = Normally open
			5	Direction: 0 = Input, 1 = Output
			4	Reserved
			3	Output interconnection fault
			2	Input interconnection fault – Open circuit
			1	Input interconnection fault – Short circuit
			0	Activation status: 0 = standby, 1 = Active
		Low – I/O1	7	Input reference: 0 = Positive reference, 1 = Negative reference
			6	Polarity: 0 = Normally closed, 1 = Normally open
			5	Direction: 0 = Input, 1 = Output
			4	Reserved
			3	Output interconnection fault
			2	Input interconnection fault – Open circuit
			1	Input interconnection fault – Short circuit
			0	Activation status: 0 = standby, 1 = Active
I/O 3..4 status	25	High – I/O4		I/O 1..2 status
		Low – I/O3		I/O 1..2 status
Relay 1..2 status	26	High – Relay2		I/O 1..2 status
		Low – Relay1		I/O 1..2 status
Relay 3..4 status	27	High – Relay4		I/O 1..2 status
		Low – Relay3		I/O 1..2 status
Relay 5..6 status	28	High – Relay6		I/O 1..2 status
		Low – Relay5		I/O 1..2 status

2.2. Coils

The following coils can be written with Write Single Coil function code (05).
The support of this function code can be enabled from FA Studio software via a dedicated option in the LAN network section (this option is disabled by default).

Coil	Address	Description
Rearm	0	ON: Rearm the device OFF: N/D
Service mode	1	ON: enter in service mode OFF: exit form service mode
Bypass Detector 1	2	ON: Detector 1 bypassed OFF: Detector 1 not bypassed
Bypass Detector 2	3	ON: Detector 2 bypassed OFF: Detector 2 not bypassed
Flowrate autocalibration Detector 1	4	ON: Start autocalibration for Detector 1 OFF: N/D
Flowrate autocalibration Detector 2	5	ON: Start autocalibration for Detector 2 OFF: N/D