APS 400

NWGD 46

Dual Wiegand network interface supporting the APERIO wireless locks control

User's guide

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1 Content

2 Product description

The *NWGD 46* [1)] dual Wiegand network interfaces are designed for connection of one or two readers, biometric sensors and similar devices with *WIEGAND output* (26, 34, 42 or 56 bits) and/or one or two *APERIO* wireless locks to the *APS BUS* of the APS 400 identification system. Up to 32 dual network interfaces can be connected to a single MCA 168 controller.

The dual network interfaces are delivered inside a cover for DIN rail mounting.

The *NWGD 46* is intended for connection of one or two standard readers with Wiegand interface independent of the identification technology and/or for control of the *APERIO* wireless locks. So, various reader technologies (HID proxy, iCLASS, Mifare, Mifare DesFire, Indala etc.) according to the needs of customers can be used in APS 400 identification system.

The module is designed for connecting readers without keypad or with reason keypad (entering a functional code) for time and attendance purposes, or for PIN pad readers.

The PIN code has 4 digit fixed length in APS 400 systems.

Pic. 1: NWGD 46

When a key press evaluation is required the keypad data transmission has to be configured as follows: One key buffering, message length 4 bits, no parity.

[1)] Commercial designation of available versions is described in *table 1*.

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3 Technical parameters

3.1 Product version

	Product designation	Catalogue number	Attachable devices
Version	NWGD 46	54446400	2x reader with a standard WIEGAND output 2x APERIO wireless lock

Table 1: Product version

3.2 NWGD 46 technical features

Technical features	Supply voltage		8 ÷ 18 VDC
	Current demand	Typical	70 mA
		Maximal	150 mA
	Memory	Cards	2x 750 IDs (for emergency function)
	Inputs		2x 2 logical potential-free contacts
	Outputs		2x 2 relay NC/NO, 2A/24V
	Indicators		LED indicators for communication and input/output status signaling on the PCB
	Tamper protection		Terminals for external NC contact
	Reader interface		2x Wiegand, 2x LED, 2x PEZO, 2x power supply terminals
	APERIO locks interface		1x RS 485 for APERIO BUS
	Communication interface		1x RS 485 – APS BUS

Table 2: Technical features of NWGD 46

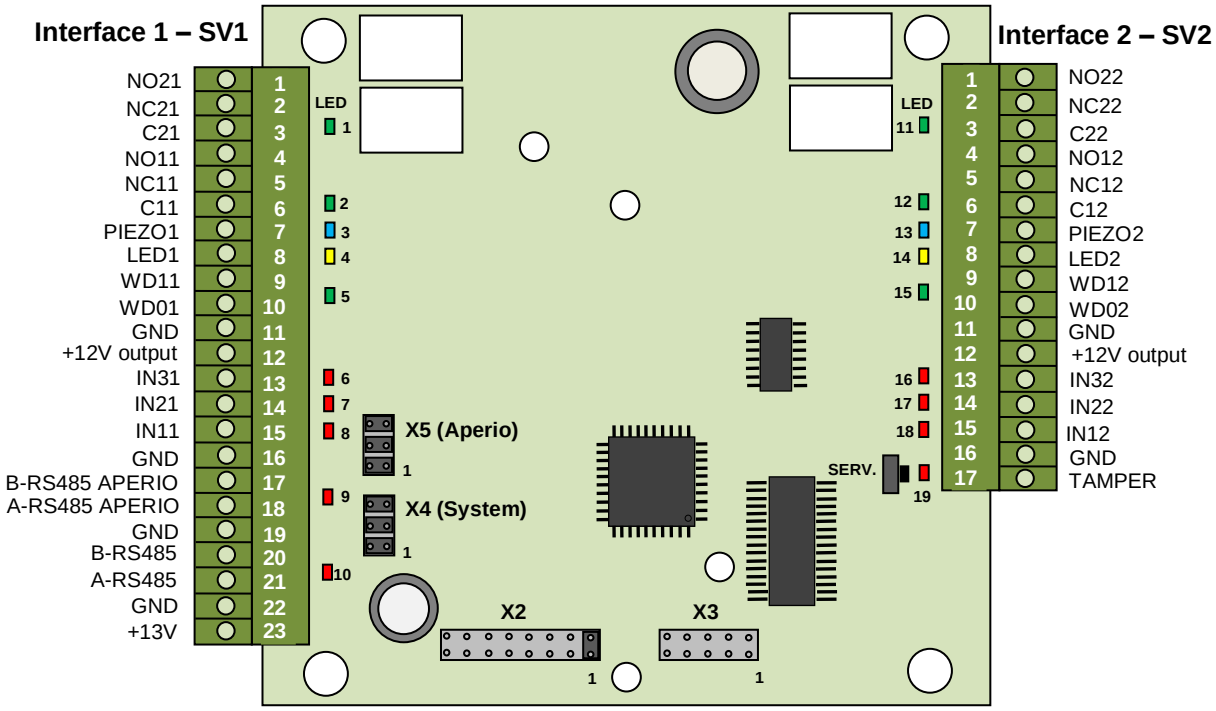
3.3 Mechanical design

Design	Weight	0,218 kg
	Operating temperature	-10°C ÷ +40°C
	Humidity	Max. 75%, non-condensing
	Environment	Indoor
	Dimensions	6 DIN units, low profile

Table 3: Mechanical design

4 Installation

4.1 Terminals and jumpers



Pic. 2 Terminals and jumpers

Configurat. X2	X2.1 ÷ 6	HW address (A0 ÷ A5)
	X2.7 ÷ 8	Reserved

Table 4: Configuration jumpers X2

X3	X3.1 ÷ 5	Factory use

Table 5: Factory use connector X3

RS 485 X4, X5	X4(5).1	Idle state definition (B)
	X4(5).2	Idle state definition (A)
	X4(5).3	Line terminator

Table 6: Setting the RS 485 lines X4, X5

Terminal block SV1	1	Relay2 NO	LED 1
	2	Relay2 NC	
	3	Relay2 C	
	4	Relay1 NO	LED 2
	5	Relay1 NC	
	6	Relay1 C	
	7	Beeper (reader)	LED 3
	8	LED (reader)	LED 4
	9	Wiegand DATA 1	LED 5
	10	Wiegand DATA 0	
	11	0 V output	
	12	+12 V output	
	13	Input 3 (reserved)	LED 6
	14	Input 2	LED 7
	15	Input 1	LED 8
	16	0 V	
	17	B - RS 485 APERIO	LED 9
	18	A - RS 485 APERIO	
	19	0 V	
	20	B wire RS 485	LED 10
	21	A wire RS 485	
	22	0 V power supply	
	23	+13,8 V power s.	

Tab. 7: Terminal block SV1 and LEDs

Terminal block SV2	1	Relay2 NO	LED 11
	2	Relay2 NC	
	3	Relay2 C	
	4	Relay1 NO	LED 12
	5	Relay1 NC	
	6	Relay1 C	
	7	Beeper (reader)	LED 13
	8	LED (reader)	LED 14
	9	Wiegand DATA 1	LED 15
	10	Wiegand DATA 0	
	11	0 V output	
	12	+12 V output	
	13	Input 3 (reserved)	LED 16
	14	Input 2	LED 17
	15	Input 1	LED 18
	16	0 V	
	17	TAMPER	LED 19

Tab. 8: Terminal block SV2 and LEDs

Service	1 short click	Confirmation of config. change (X2)

Table 9: Service button

4.2 Standard connection (recommended, not obligatory) [2)]

Connection	Input 1	Door contact, active when door closed
	Input 2	Request to exit button or handle contact, active when button or handle pressed
	Output 1	Door lock control (relay1)
	Output 2	AUX functions (relay2)

Table 10: Standard connection

[2)] The function of inputs and outputs is defined by user's programming of the controller.

4.3 LED Indicators

LED indicators	Red LED 10 (9)	Continuously lit	Online operating mode via RS 485
		Blinking with 2s period	Offline mode, emergency function enabled
		Short flashing with 1 s period	Offline mode, emergency function disabled
	Yellow LED 4 (14)		Copying the status of the second output
	Red LED 10		Communication on the system BUS
	Red LED 9		Communication on the APERIO BUS
	Green LED 5 (15)		ID media reading from external reader or from APERIO lock reader
	Green LED 6,7,8 (16,17,18)		Activated inputs TAM, IN2, IN1
	Green LED 1,2 (11,12)		Switched on relays RE2, RE1
	Blue LED 3 (13)		Activated beepers (PIEZO1,2 outputs)

Table 11: LED indicators

4.4 Installation instructions

The door module is intended for DIN rail mounting into a switchboard or directly on the wall using the DIN rail enclosed.

5 Setting parameters of the module

	Parameter	Possible range	Default setting
Parameters	Enabling of emergency function	YES / NO	NO
	Address on a communication line	1 ÷ 64	1
	Keypad function	Reason / PIN / Code	Reason
	Operating mode	Standard/Wiegand OUT	Standard
	All parameters are given by programming through the MCA 168 control module, see http://www.techfass.cz/files/aps_400_config_en.pdf		

Table 12: Configurable parameters

5.1 Module parameters setting

Setting of all parameters of the reader module can be done only when the module is connected to the system bus of MCA 168 controller. Detailed instructions for setting reader module parameters are described in the *APS 400 Network Reader* configuration program user's guide available at: http://www.techfass.cz/files/m_aps_400_network_reader_en.pdf.

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5.2 HW address setting

HW address setting is defined by the configuration of address jumpers X2.1 ÷ 6 (*tab. 4, tab.13*).

When configure the address jumpers it is necessary to keep in mind that the module occupies two successive addresses on system bus and X2 jumpers define the lower one. E.g., it is not possible to set the following module address to the value of the previous one + 1; the address conflict appears on system bus in this case.

Address jumpers X2

Address	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
X2.1	●	○	●	○	●	○	●	○	●	○	●	○	●	○	●	○
X2.2	○	●	●	○	○	●	●	○	○	●	●	○	○	●	●	○
X2.3	○	○	○	●	●	●	●	○	○	○	○	●	●	●	●	○
X2.4	○	○	○	○	○	○	○	●	●	●	●	●	●	●	●	○
X2.5	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	●
X2.6	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Address	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
X2.1	●	○	●	○	●	○	●	○	●	○	●	○	●	○	●	○
X2.2	○	●	●	○	○	●	●	○	○	●	●	○	○	●	●	○
X2.3	○	○	○	●	●	●	●	○	○	○	○	●	●	●	●	○
X2.4	○	○	○	○	○	○	○	●	●	●	●	●	●	●	●	○
X2.5	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	○
X2.6	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	●
Address	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
X2.1	●	○	●	○	●	○	●	○	●	○	●	○	●	○	●	○
X2.2	○	●	●	○	○	●	●	○	○	●	●	○	○	●	●	○
X2.3	○	○	○	●	●	●	●	○	○	○	○	●	●	●	●	○
X2.4	○	○	○	○	○	○	○	●	●	●	●	●	●	●	●	○
X2.5	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	●
X2.6	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Address	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64
X2.1	●	○	●	○	●	○	●	○	●	○	●	○	●	○	●	○
X2.2	○	●	●	○	○	●	●	○	○	●	●	○	○	●	●	○
X2.3	○	○	○	●	●	●	●	○	○	○	○	●	●	●	●	○
X2.4	○	○	○	○	○	○	○	●	●	●	●	●	●	●	●	○
X2.5	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	○
X2.6	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	○

Table 13: Address jumpers X2

Legend:

● … set (ON)

○ … removed (OFF)

Confirmation of any address setting by clicking the service button on the PCB is required. If not the address change will be taken into account after the nearest disconnecting and connecting of the module supply voltage.

5.3 Configuration of the reader keypad

The door controller can accommodate either reader without keypad or keypad readers. When a key press evaluation is required by the door controller, the keypad data transmission has to be configured as follows:

- One key buffering.

- Message length 4 bits.
- No parity.

5.4 WIEGAND input data interpretation

5.4.1 Standard configuration

The module accepts the *WIEGAND* formats mentioned in the *table 14*. If the read signal is formatted otherwise, the data are not considered as valid and thus ignored. If another format of data is required to be considered as valid, it is necessary to set up the *User configuration* of the data read at the WIEGAND input. The table also shows the process used for individual width of read data.

Accepted formats	Read data width	Process	Resulting code width
	26 bits	Parity bits cut off (in front and at the back)	24 bits
	32 bits	Data bytes reversed	32 bits
	34 bits	Parity bits cut off (in front and at the back)	32 bits
	37 bits	Parity bits cut off (in front and at the back)	35 bits
	42 bits	Parity bits cut off (in front and at the back)	40 bits
	44 bits	Last 4 bits cut off	40 bits
	56 bits	Data bytes reversed	56 bits

Table 14: Accepted formats of read WIEGAND data– standard configuration

5.4.2 User configuration

The module offers an option to use the *user configuration of WIEGAND input interpretation*. By default the user configuration is not used. To enable user configuration, see the user's guide to the *APS 400 Network Reader* program, which is available at http://www.techfass.cz/files/m_aps_miniplus_reader_en.pdf.

Note: User configuration *WIEGAND input* requires a deeper knowledge of the issue; we recommend leaving the setting to an installation company.

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6 Interface module functioning

6.1 Operating modes

The NWGD 46 dual Wiegand interfaces are intended for online operating mode on APS 400 system BUS (*APS BUS*). The activity of the modules is defined by the system controller; so the modules are able to provide various functions not only controlling of the door.

In case of the communication line fails the modules can work in offline mode (when the *emergency function* is enabled) - it concerns the exit readers mostly. The “Door Open“ function for last 748 valid cards registered before can be performed in this mode only.

6.2 Emergency “Door Open” function description

When the “Door Open“ function is activated, the door lock is released and the beeper activated until the door is open or 5 s door lock release time has elapsed.

All events triggered while the offline mode is in progress are saved neither in the controller nor in the module memory.

6.3 Using the module with the APERIO wireless locks

The module enables connection of two *APERIO* wireless locks to the *RS 485 BUS* reserved for the APERIO communication. The locks are identified by their HW addresses at the APERIO BUS, the *NWGD 46* interface expects locks with *addresses 1 and 2*. Since such lock is connected to the BUS, the module opens communication with it immediately. The resources of the module belonging to its lower address (access rights, events archive, etc.) are used for the lock with HW address 1, resources belonging to its higher address are used for the lock with HW address 2.

Reading an ID at the *APERIO* lock reader raises an identification event at the relevant address of the module. According to the access rights evaluation a *Valid*, *Invalid* or *Unknown* event is raised. If the program of the system controller *activates its first (lock) output* at relevant address, the *APERIO wireless lock is released*.

Since the *APERIO* wireless lock is powered from a battery, it is “waked up” from a power saving mode (in which it standardly operates) only after an ID is read at its sensor, otherwise it saves battery and is not able to respond to the commands of the module. Therefore the *APERIO* lock release can be performed only after a valid card is read at its sensor. Activating the relay output of the module *does not affect the APERIO wireless lock* any other time than after reading an ID (such functions are bound to the interface lock relays only)!

6.4 Aperio – autodetection of Mifare sector reading

The older version of *Aperio* wireless locks FW occasionally misinterprets *Mifare DESFIRE* IDs as Mifare sector data IDs. This error can be compensated (since *FW version 2.78*) from the ACS side by selecting *Disable auto detection of Mifare sector data*. More information can be found in the user’s guide to the APS 400 Network Reader program.

7 Useful links

- Wiring diagrams: http://techfass.cz/diagrams-aps-400-en.html
- Program equipment: http://techfass.cz/software-and-documentation-en.html