APS 400

NREP 78

APS 400 network reader module for wall-mounting and for BPT Xolid panels

User's guide

techfass®

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1 Content

2 Product Description

The *NREM 78* [1)] reader modules are designed for connection to the *APS BUS* of the *APS 400* identification system. Up to 64 reader modules *NREM 78* can be connected to a single MCA 168 controller.

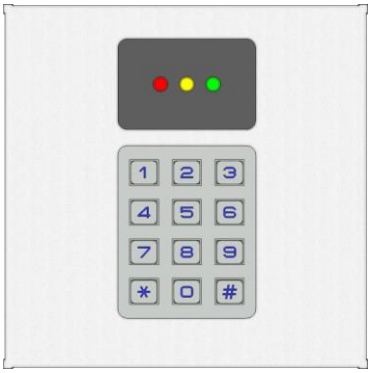
2.1 NREP 78 module

The reader module (*pic. 1*a) is intended for wall-mounting in both indoor and outdoor environment.

Pic. 1a: NREP 78

2.2 NREP 78X module

The reader module (*pic. 1b*) is designed for installation in Xolid entry panels of BPT audio and video system, where it occupies space of a single module.



Pic. 1b: NREP 78X

2.3 NREP 78E module

The reader module (pic. 1c) is designed for OEM applications, supplied as PCB. The module is designated for customers' own installation boxes.

Pic. 1c: NREP 78E

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

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3 Technical parameters

3.1 Product version

Product version	Product designation	Mechanical design	Catalogue number	Module features [2]	
				TF	EM
	NREP 78 – TF	*Wall-mounted*	54478400	✓	✘
	NREP 78X – TF	*Xolid panel*	54478410	✓	✘
	NREP 78E – TF	*OEM solution*	54478420	✓	✘
	NREP 78 – EM	*Wall-mounted*	54478401	✓	✓
	NREP 78X – EM	*Xolid panel*	54478411	✓	✓
	NREP 78E – EM	*OEM solution*	54478421	✓	✓

Table 1: Product version

[2] *TF* – TECHFASS factory ID media reading; *EM* – EM Marin ID media reading;

3.2 Technical features

Technical features			
	Supply voltage		8 ÷ 28 VDC
	Current demand	Typical	70 mA
		Maximal	120 mA
	Version with keypad		Numeric keypad, 12 keys
	ID technology, typical reading range	EM Marin	5 cm (with ISO card)
	Memory		750 ID (emergency function)
	Inputs		2x logical potential-free contact
	Output		2x relay NC/NO, 2A/24V
	I/O Port	External device	Ext. tamper / ext. reader buzzer control / Reading synchronization: MASTER / SLAVE mode
	Signalization		3x LED 1x PIEZO
	Tamper protection	Opening the cover Against tearing-off	Opto-electronic
	Communication interface		RS 485 – APS BUS
	Alternative data input / output		WIEGAND (configurable)

Table 2: Technical features

3.3 Special accessories

Accessories	WIO 22	51901200	Remote control module, 2x relay

Table 3: Special accessories

3.4 Using WIO 22 module for remote output control

The *WIO 22* remote control *WIEGAND* relay module is designated for secure output control of APS system reader modules. The door open or other functions can be controlled from the module located inside the secure area, while the reader module can be located in the non-secure area.

The module is controlled by *WIEGAND* signal directly from the reader module working in standard operating mode. The module must be paired with appropriate reader module before use.

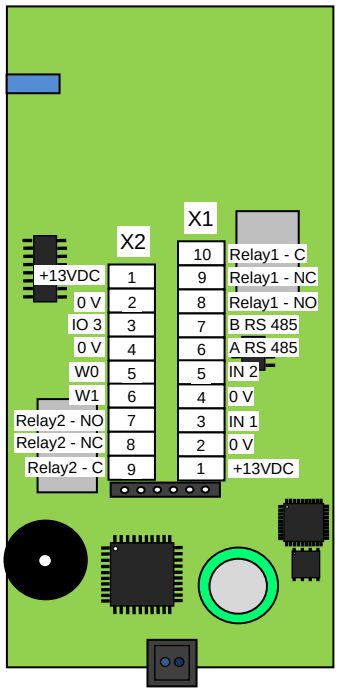
3.5 Mechanical design

Mechanical design	Weight	NREP 78	0.420 kg
		NREP 78X	0.306 kg
		NREP 78E	0.129 kg
	Operating temperature		-25 ÷ 60 °C
	Humidity		Max 95%, non-condensing
	Housing		IP 54, IK 07
	Pigtail (NREP 78)		2 m
	Environment		Indoor and outdoor
	Dimensions	NREP 78	115 x 62 x 35 mm
		NREP 78X	120 x 120 x 33 mm
		NREP 78E	104 x 52 x 35 mm

Table 4: Mechanical design

4 Installation

4.1 Terminals and wiring description



Pic. 2: NREP 78X/E

Terminal description X1	#	Color	Function
	1	Red	+13 V pow. supply
	2	Blue	0 V pow. supply
	3	Yellow	Input 1
	4	Grey brown	0 V
	5	Grey	Input 2
	6	Black	A – RS 485
	7	White	B – RS 485
	8	Violet	NO relay 1
	9	Grey pink	NC relay 1
	10	Brown	C relay 1

Table 5: Terminal description X1

Terminal description X2	#	Color	Function
	1	Red blue	+13 V
	2	Green	0 V
	3	Pink	IO Port 3
	4	N / A	0 V
	5	Green white	Wiegand data 0
	6	Green brown	Wiegand data 1
	7	White grey	NO relay 2
	8	White yellow	NC relay 2
	9	Yellow brown	C relay 2

Table 6: Terminal description X2

4.2 LED indicators description

Pic. 3: LED indicators description

LED indicators	D1	Communication status, ID media reading
	D2	Door lock status, programming mode
	D3	Reserved

Table 7: LED indicators

4.3 Standard connection

Standard 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 (relay) + D2 = green
	Output 2	Auxiliary function (relay) + D2 = yellow
	I/O Port	External tamper (Standard operating mode) External reader buzzer control (op. mode with entry reader) Reading synchronization: MASTER / SLAVE mode

Table 8: Standard connection

4.4 D1 LED Indication

LED indicators	D1	Continuously lit (red)	Online operating mode via RS 485
		Blinking with 2s period (red)	Offline mode, emergency function enabled
		Short flashing with 1 s period (red)	Offline mode, emergency function disabled
		Fast switching (red/green)	Address setting mode
		Single flash (green)	ID media reading
	D2	Green	Controlled by the controller's program [3)], copies 1nd output status (Relay1)
		Yellow	Controlled by the controller's program [3)], copies 2nd output status (AuxOutput)

Table 9: LED indicators

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

4.5 Installation instructions

The reader module uses passive RF/ID technology, which is sensitive to RF noise sources. Noise sources are generally of two types: radiating or conducting.

Conducted noise enters the reader via wires from the power supply or the host. Sometimes, switching power supplies generate enough noise to cause reader malfunction, it is recommended to use linear system power supplies.

Radiated noise is transmitted through the air. It can be caused by computer monitors or other electrical equipment generating electromagnetic fields.

Consequently, a short distance between the reader modules themselves can cause reading malfunctions – for correct operation it is necessary to keep a minimum distance of 50 cm. Various metallic constructions may have a negative influence on this distance; if there are any doubts, it is recommended to perform a practical test before final mounting.

Nearby metal surfaces may cause a decrease in reading distance and speed. This is caused by the combined effects of parasitic capacitance and conductance.

5 Setting parameters of the reader module

5.1 Configurable parameters

	Parameter	Possible range	Default setting
Parameters	Enabling of emergency function	YES / NO	NO
	Address on a communication line	1 ÷ 64	1
	Internal reader configuration	Configurable	Standard
	Keypad function	Key code / PIN / ID	PIN
	Operating mode	Standard / Wiegand Input / Wiegand Output	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 10: Configurable parameters

5.2 Reader 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.

6 Reader module functioning

6.1 Operating modes

The *NREP 78* reader modules 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 750 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 preset 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 reader memory.

6.3 Read ID media format

6.3.1 EM Marin ID media format

The EM Marin ID media format can be changed into selected 24, 32 or 40 bits length of ID code. The default length is 40 bits. This setting is only changed when unifying of the ID media codes length is required – in combined systems with WIEGAND output readers with a fixed WIEGAND data format IDs (more information in *APS 400 Network Reader* user’s guide available at http://www.techfass.cz/files/m_aps_400_network_reader_en.pdf).

6.4 Wiegand interface configuration

6.4.1 Standard operating mode

This is the module default operating mode. The Wiegand interface is used for controlling the WIO 22 module in this configuration. When the reader module operates in the standard operating mode, the I/O Port (*tab. 6*) is used as an input for monitoring an external device tamper status.

6.4.2 Wiegand output

The module can be configured into a standard reader with a *WIEGAND output* in 26, 32, 42 or 44 bits format for *EM Marin* technology ID media. Read IDs are formatted with the previous setting first (see *chapter 6.3.1*), after that they are sent in the output format.

Wieg	ID media technology	Available configuration of the WIEGAND output format
	EM Marin	26bit, 32bit, 42bit, 44bit

Table 11: ID media format in WIEGAND operating mode

Two long beeps and the red LED lit feature powering up the module. The green LED blink indicates an ID reading.

Individual signals function in *WIEGAND output* operating mode is described in *table 12*.

Wiegand		
	Input 1	Beeper control (0 V active)
	Input 2	Yellow LED control (0 V active)
	Output 1 (relay)	Tamper signaling; it follows the alarm state of tamper sensors (tamper signal = relay switched on) [3)]

Table 12: Signal function in WIEGAND operating mode

Key codes sent in *WIEGAND output* operating mode are described in *table 13*.

Key codes	Key pressed	Keypad configuration	
		PIN / ID keypad	Key code keypad
	1 ÷ 9 (digits)	Codes 1 ÷ 9	
	# (hash)	Code 11	
	0	Code 0	Code 10
	✳ (star)	Code 10	Code 0

Table 13: Key codes sent in WIEGAND output operating mode

Since the *FW version 2.79* the reading synchronization of a *couple of TECHFASS readers* is implemented, enabling to *cancel the mutual disturbance* of the modules. The reader module offers the *Wiegand data interface synchronization* in *MASTER* mode.

6.4.3 Wiegand input (entry reader)

The module can be configured into a mode of controlling the door from both sides (*entry reader mode*).

In the *entry reader mode* an identification at an external reader connected via the *WIEGAND interface* acquires a *reason code 255*; at the same time the reader module operates standardly, the reason codes equal zero.

When the reader module operates in the entry reader operating mode, the I/O Port (*tab. 6*) is used as an output for controlling the entry reader buzzer.

Since the *FW version 2.79* the reading synchronization of a *couple of TECHFASS readers* is implemented, enabling to *cancel the mutual disturbance* of the modules. The reader module offers the *Wiegand data interface synchronization* in *SLAVE* mode.

The *WIEGAND input* and *WIEGAND output* operating modes are mutually exclusive.

6.5 Keypad function

The keypad function setting can be set to one of the following options:

- *Key code* – this option is used when the keypad is used for entering a code of reason to exit. The key code is sent together with the card ID as well as stored in the events archive of the control module. It is necessary to press the key before identification, last pressed key is considered as the valid one

- *PIN* – with this option selected the keypad is used for entering PIN codes, a correct PIN is required for valid identification when this option is selected. PIN can be entered before or after identification. Last 4 digits entered are considered to be a PIN code.

The PIN code entering requirement can be operatively changed (allowed/suppressed) by appropriate command in the system controller's program created in *APS Config* program.

- *ID* – this option enables entering a code at the keypad which is used as a user's read ID medium; at the same time the ID medium can be used as well. ID code must contain at least 4 digits; last 10 digits entered are used at max.

Table 14 defines the interpretation of keys pressed at the keypad of *NREP 78 reader modules* according to the program configuration of the keypad function.

Pressed key interpretation	Key pressed	Keypad configuration	
		PIN / ID keypad	Key code keypad
	Keys 1 ÷ 9 (digits)	Digits 1 ÷ 9	Reason 1 ÷ 9
	Key 0	Digit 0	Reason 10
	Key ✳ (star)	Digits input cancel	Reason 0
	Key # (hash)	Input submit (enter)	Reason 11

Table 14: Pressed key interpretation

6.6 Reading synchronization

Since the *FW version 2.79* the reading synchronization of a *couple of TECHFASS readers* is implemented, enabling to *cancel the mutual disturbance* of the modules. The reader module offers to use the *IO synchronization* in both *MASTER* and *SLAVE* mode. The *input/output port 3* is used as the *synchronization signal*.

7 Useful links

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