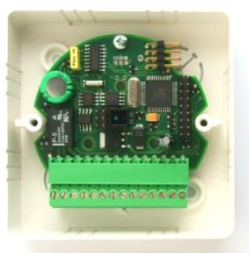


# **NREM 76**

*Network reader modules*

*User's guide*



**techfass®**

## 1 Content

1	Content.....	2
2	Product Description .....	3
2.1	NREM 76 module .....	3
2.2	NREM 76E module .....	3
2.3	NREM 76.BTW and NREM 76.BTW module.....	3
3	Technical parameters .....	4
3.1	Product version.....	4
3.2	Technical features.....	4
3.3	Special accessories .....	5
3.4	Using WIO 22 module for remote output control .....	5
3.5	NREM 76 mechanical design.....	6
3.6	NREM 76E mechanical design.....	6
3.7	NREM 76.BTS and NREM 76.BTW mechanical design .....	6
4	Installation .....	7
4.1	Terminals and jumpers .....	7
4.2	Standard connection (recommended, not obligatory) <sup>4)</sup> .....	8
4.3	LED Indicators .....	8
4.4	Installation instructions.....	8
5	Setting parameters of the reader module .....	9
5.1	HW address setting.....	9
5.2	Configurable parameters.....	10
5.3	Reader module parameters setting .....	10
6	Reader module functioning .....	10
6.1	Operating modes .....	10
6.2	Emergency “Door Open” function description.....	10
6.3	Read ID media format.....	11
6.4	Wiegand interface configuration.....	11
6.5	Reading synchronization.....	12
7	Useful links .....	12

## 2 Product Description

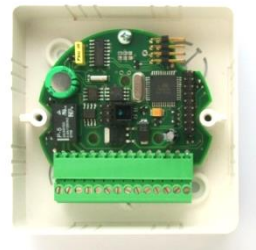
The **NREM 76**<sup>1)</sup> reader modules are designed for connection to the **APS BUS** of the APS 400 identification system. Up to 64 reader modules NREM 76 can be connected to a single MCA 168 controller.

The reader modules are available in various modifications differing in the way of usage.

### 2.1 NREM 76 module

Reader module for general use designed for applications with remote antenna module, see *Pic. 1*.

The module can be installed wherever using a standard module is inappropriate for mechanical or security reasons. Reading range is dependent on the type of the antenna module and its frequency tune-up; this is why it is not recommended to adjust the cable supplied with the original antenna module.



*Pic. 1: NREM 76 without cover*

### 2.2 NREM 76E module

Complete reader module designed for installation into round installation boxes with inner diameter 68 mm. All-purpose conception of the module's board enables installation in the most of electrical devices' cover designs in blocks of flats and therefore adjust the appearance of the reader modules to the appearance of other devices designed by an architect (*Pic.2*).



*Pic. 2: NREM 76E+KU68 box*

### 2.3 NREM 76.BTW and NREM 76.BTS module

Applied reader module in an installation box KU68 with a cover panel in Bticino Light design in white (NREM 76.BTW, *Pic. 3a*) or silver (NREM 76.BTS, *Pic.3b*) color.



*Pic. 3 a: NREM 76.BTW*



*Pic. 3 b: NREM 76.BTS*

<sup>1)</sup> Commercial designation of available versions is described in *table 1*.

## 3 Technical parameters

### 3.1 Product version

Product version	Product designation	Product housing	Catalogue number	Module features <sup>2)</sup>	
				TF	EM
	NREM 76 – TF	LK 80, no antenna	54476200	✓	✗
	NREM 76E – TF	Designed for KU 68	54476000	✓	✗
	NREM 76.BTS – TF	Bticino Light - Silver	54476400	✓	✗
	NREM 76.BTW – TF	Bticino Light - White	54476600	✓	✗
	NREM 76 – EM	LK 80, no antenna	54476201	✓	✓
	NREM 76E – EM	Designed for KU 68	54476001	✓	✓
	NREM 76.BTS – EM	Bticino Light - Silver	54476401	✓	✓
	NREM 76.BTW – EM	Bticino Light - White	54476601	✓	✓

Table 1: Product version

<sup>2)</sup> **TF** – TECHFASS factory ID media reading; **EM** – EM Marin ID media reading;

### 3.2 Technical features

Functional Properties	Supply voltage		8 ÷ 15 VDC
	Current demand	Typical	95 mA
		Maximal	130 mA
	Version with keypad		N/A
	ID technology, typical reading range <sup>3)</sup>	EM Marin	6 cm (with ISO card)
	Memory		750 ID (for emergency function)
	Inputs		2x logical potential-free contact
	Outputs		Relay NC/NO, 2A/24V Transistor output 5V/5mA + yellow LED
	I/O Port	External device	Ext. tamper / ext. reader buzzer control / Reading synchronization: MASTER / SLAVE mode
	Indicators		3x LED 1x PIEZO
	Tamper protection		Opto-electronic
	Communication interface		RS 485 – APS BUS
	Alternative data output		WIEGAND (configurable)

Table 2: Technical features

<sup>3)</sup> The reading range of MREM 76 product versions without embedded antenna is dependent on the type of used external antenna.

## 3.3 Special accessories





Special accessories	AEM 12	51400300	Antenna module for hidden assembly (no buzzer or LED)
			
	AEM 12.1	51400301	Antenna module for hidden assembly (buzzer present, no LED)
			
	AEM 13	51400400	Antenna module with a ferrite coil for Targha panels
			
	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 controller 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 NREM 76 mechanical design

Design	Weight	0.033 kg
	Operating temperature	-10°C ÷ +40°C
	Humidity	Max. 75%, non-condensing
	Environment	Indoor
	Dimensions	81x81x25 mm

Table 4 a): NREM 76 mechanical design

### 3.6 NREM 76E mechanical design

Design	Weight	0.018 kg
	Operating temperature	-10°C ÷ +40°C
	Humidity	Max. 75%, non-condensing
	Cover	According to used installation box
	Dimensions	Suitable for Ø 68 mm installation boxes

Table 4 b): NREM 76E mechanical design

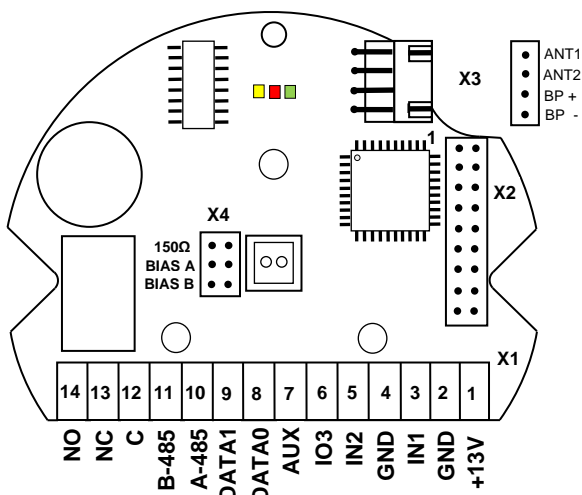
### 3.7 NREM 76.BTS and NREM 76.BTW mechanical design

Design	Weight	0.102 / 0.160 kg (W/S)
	Operating temperature	-10°C ÷ +40°C
	Humidity	Max. 75%, non-condensing
	Environment	Indoor
	Color	White (NREM 76.BTW) Silver (NREM 76.BTS)
	Dimensions	90x80x55 mm

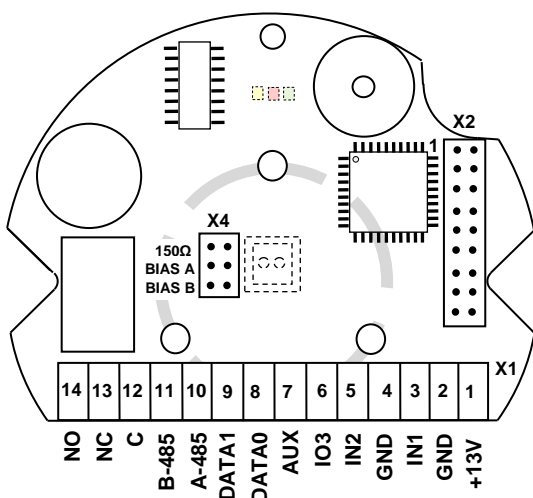
Table 4 a): NREM 76.BTS and NREM 76.BTW mechanical design

## 4 Installation

### 4.1 Terminals and jumpers



Pic. 5 a): NREM 76



Pic. 5 b): NREM 76E, NREM 76.BTW, NREM 76.BTS

Address X2	X2.1 ÷ 6	HW address (A0 ÷ A5)
	X2.7	Reserved
	X2.8	Reserved
	X2.9	Factory use

Table 5: Address jumpers X2

Terminal description X1	1	Supply voltage +13,8 V
	2	Supply voltage 0 V
	3	Input 1
	4	0 V
	5	Input 2
	6	IO Port 3
	7	Alarm output
	8	Wiegand DATA 0
	9	Wiegand DATA 1
	10	A cable - RS 485 line
	11	B cable - RS 485 line
	12	Relay C
	13	Relay NC
	14	Relay NO

Table 6: Terminal description X1

RS 485 X4	150 Ω	Line termination
	BIAS A	Idle state definition-A
	BIAS B	Idle state definition -B

Table 7: Line settings X4

Connector X3	ANT1	Antenna
	ANT2	Antenna
	BP +	Buzzer (+)
	BP -	Buzzer (-)

Table 8: Antenna module connector X3

## 4.2 Standard connection (recommended, not obligatory) <sup>4)</sup>

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)
	Output 2	AUX functions (transistor output +5 V/5mA) + yellow LED
	I/O Port	External tamper (Standard operating mode) External reader buzzer control (op. mode with entry reader) Reading synchronization: MASTER / SLAVE mode

Table 9: Standard connection

## 4.3 LED Indicators

LED indicators	Red	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
	Green		ID media reading
	Yellow		Controlled by the controller's program <sup>4)</sup> , copies 2nd output status (AuxOutput)

Table 10: LED indicators

<sup>4)</sup> The function of inputs and outputs is defined by user's programming of the controller.

## 4.4 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 comes into 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 the linear system power suppliers.

Radiated noise is transmitted through the air. It can be caused e.g. by computer monitors or other electrical equipment radiating electromagnetic field.

From this point of view a short distance between the reader modules themselves can cause reading malfunctions – for correct function it is necessary to keep a minimum distance 50 cm. Moreover, this distance can be negatively influenced by various metallic constructions (if there are any doubts, it is useful to make a practical test before the final mounting).

The nearby metal surfaces can cause the decreasing of reading distance and speed. This is caused by the combined influence of parasitic capacitance and conductance.



## 5 Setting parameters of the reader module

### 5.1 HW address setting

HW address setting is defined by the configuration of address jumpers X2.1 ÷ 6, see *tab. 11, tab. 5*.

Address jumpers X2	Address	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Table 11: Address jumpers X2 Legend: ● ... set (ON) ○ ... removed (OFF)
	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	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	○	

Reader module's reset is required after any change of address setting, disconnect and connect the supply voltage again.

## 5.2 Configurable parameters

Parameters	Parameter	Possible range	Default setting
	Enabling of emergency function	YES / NO	NO
	Address on a communication line	1 ÷ 64	1
	Internal reader configuration	Configurable	Standard
	Operating mode	Standard / Wiegand Input / Wiegand Output	Standard
All parameters are given by programming through the MCA 168 control module, see <a href="http://www.techfass.cz/files/aps_400_config_en.pdf">http://www.techfass.cz/files/aps_400_config_en.pdf</a>			

Table 12: Configurable parameters

## 5.3 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](http://www.techfass.cz/files/m_aps_400_network_reader_en.pdf).

# 6 Reader module functioning

## 6.1 Operating modes

The *NREM 76* 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](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 13: 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 14*.

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) <sup>3)</sup>

*Table 14: Signal function in WIEGAND 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 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>