

APS 400

NREM 59E

APS 400 network reader module for Digitha entry panels

User's guide



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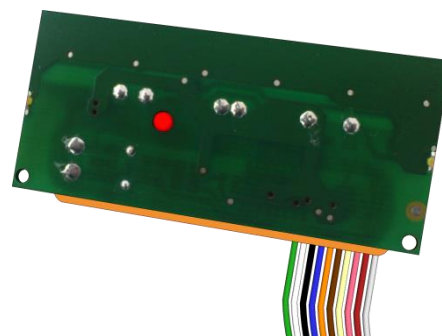
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2 Product Description

The **NREM 59E** ¹⁾ reader modules are designed for connection to the **APS BUS** of the **APS 400** identification system. Up to 64 reader modules **NREM 59E** can be connected to a single MCA 168 controller.

The module is designed for installation in **Digitha** entry panels of BPT audio and video systems, where it occupies space reserved for a reader module.



Pic. 1: NREM 59E

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

3 Technical parameters

3.1 Product version

Product version	Product designation	Module designed for panel	Catalogue number	Module features ²⁾	
				TF	EM
	NREM 59E – TF	Digitha	54459000	✓	✗
	NREM 59E – EM	Digitha	54459001	✓	✓

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 ÷ 18 VDC
	Current demand	Typical	60 mA
		Maximal	120 mA (8 V)
	Version with keypad		N/A
	ID technology, typical reading range	EM Marin	4 cm (with ISO card)
	Memory		750 ID (emergency function)
	Inputs		1x Logical potential-free contact 1x Logical potential-free contact
	Output	Door lock	1x open collector 0V active – for connection to the REX device of the Digitha panel
	I/O Port	External device	Ext. tamper / ext. reader buzzer control / Reading synchronization: MASTER / SLAVE mode
	Signalization		1x LED 1x PIEZO
	Tamper protection		N / A
	Communication interface		RS 485 – APS BUS
	Alternative data input / output		WIEGAND (configurable)

Table 2: Technical features

3.3 Special accessories


Special 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.

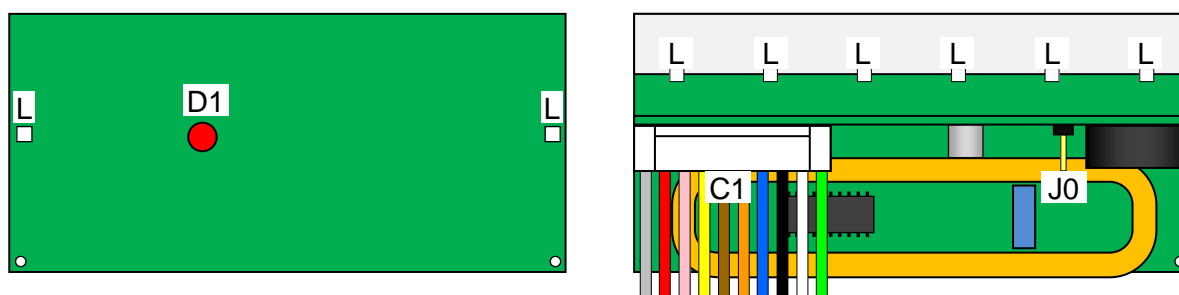
3.5 Mechanical design

Mechanical design	Weight	0,027 kg
	Operating temperature	-25 ÷ 60 °C
	Humidity	Max. 95%, non-condensing
	Housing	IP 54, IK 04 (built in the entry panel)
	Cable length	0,4 m
	Dimensions	30 x 62 x 20 mm

Table 4: Mechanical design

4 Installation

4.1 Network reader module description



Pic. 2: NREM 59E reader module front and rear view

Module description	Designation	Purpose
	C1	Connector for C1 cable (10-wires) connection
	D1	Red-green LED indicator
	J0	Jumper for RS 485 line termination
	L	Lightening LEDs

Table 5: Connectors, jumpers and LED indicators description

4.2 C1 cable wiring description

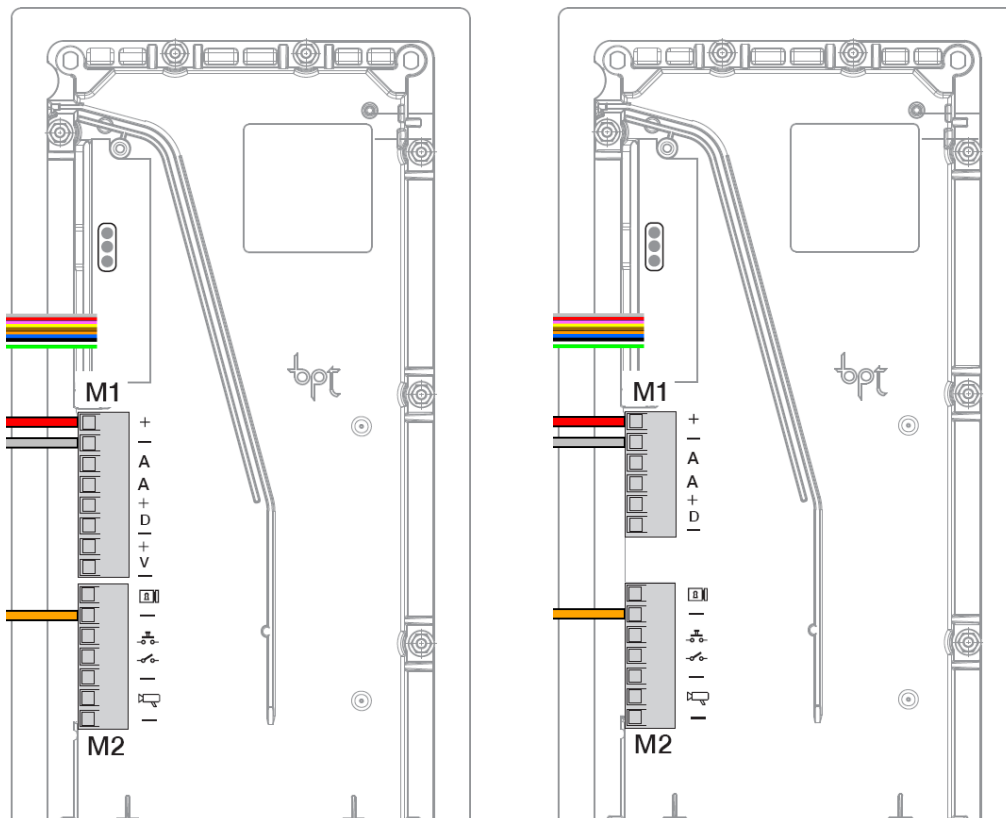
C1 cable wires	Color	Function	Color	Function
	Grey	GND (0V)	Orange	Input 2 (IN2)
	Red	Power supply +8 ÷ +18VDC	Blue	Output 1 - OC
	Pink	WIEGAND data 1	Black	A wire - RS485 line
	Yellow	WIEGAND data 0	White	B wire - RS485 line
	Brown	Input 1 (IN1)	Green	I/O Port 3

Table 6: C1 cable wiring description

All unused wires must be mutually isolated!

4.1 Reader module standard connection

4.1.1 Connection independent of the entry panel function (recommended)



Pic. 3a: Standard reader module connection with use power supply and – door lock contact from Digitha entry panel in DDVC/08 VR version (left) and DDC/08 VR version (right)

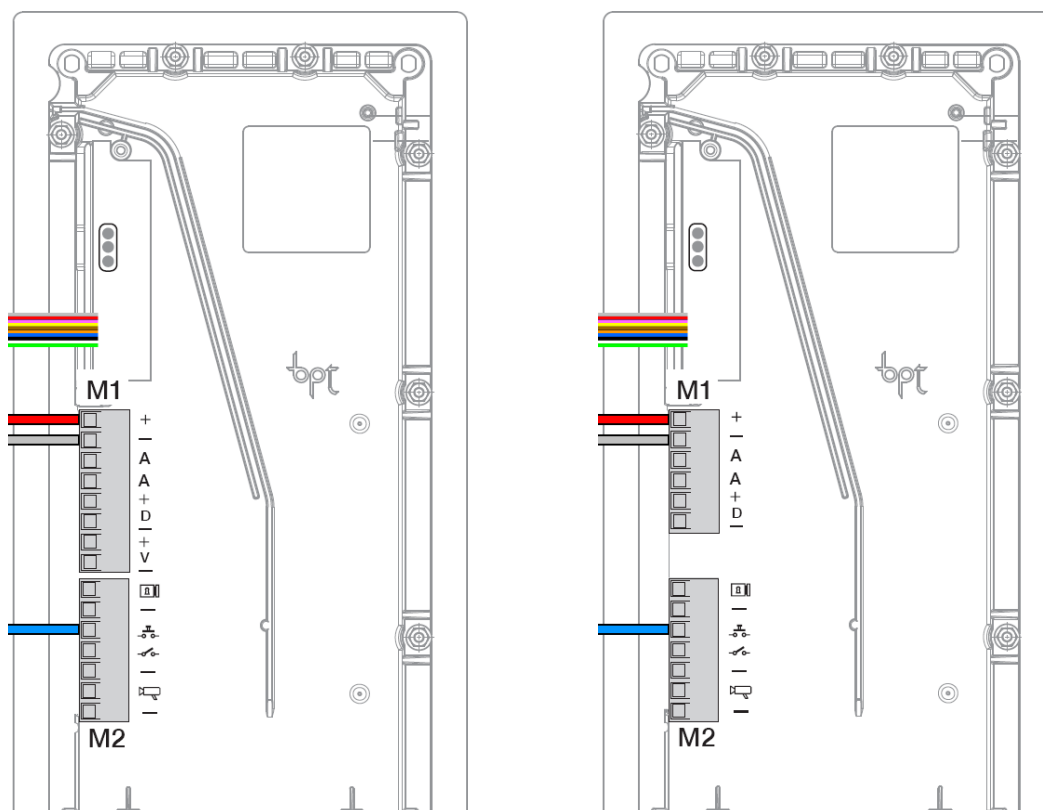
Connection	Contact	Digitha panel	C1 cable wires
	1	Power supply contact + (M1)	Red
	2	Power supply contact – (M1)	Grey
	3	Door lock contact – (M2)	Orange

Table 7a: Reader module standard connection

This connection requires configuring the second input of the reader module as REX device (it is switched by the door lock contact of the Digitha panel).

The door lock is controlled by the OC output (switched to GND) from the reader module (blue wire).

4.1.2 Connection using the REX contact of the entry panel



Pic. 3b: Standard reader module connection with use power supply and REX device contact from Digitha entry panel in DDVC/08 VR version (left) and DDC/08 VR version (right)

Connection	Contact	Digitha panel	C1 cable wires
	1	Power supply contact + (M1)	Red
	2	Power supply contact – (M1)	Grey
	3	REX device contact \overline{b} (M2)	Blue

Table 7b: Reader module standard connection

In this connection the reader module switches the REX device contact of the Digitha panel.

The door lock is controlled by the door lock contact from the Digitha panel.

4.2 Standard connection of inputs and outputs

Std. connection	Input 1	Door contact, active when door closed
	Input 2	Request to exit button or handle contact, (+8 ÷ +18 V) when button or handle active
	Output 1	Door lock control open collector
	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

4.3 D1 LED Indication

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
		Fast switching followed green LED with 2s period	Address setting mode
	Green		ID media reading
	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.

4.4 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 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.

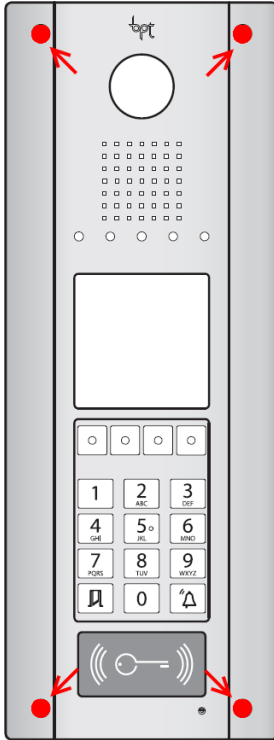
4.5 Mounting and removal the module

4.5.1 Module mounting

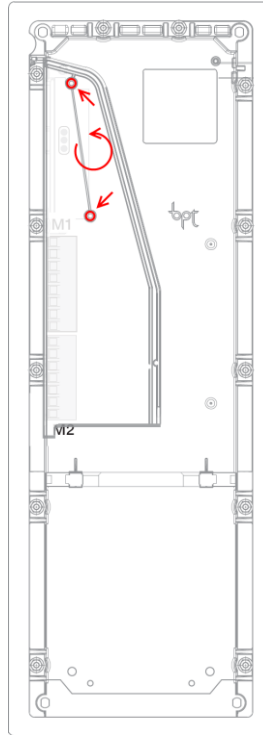
When mounting the module it is necessary to remove the screws inserted in the front metal part of the *Digitha* entry panel (*pic. 4a*). Turn the panel over and unscrew both cross-screws holding the plastic cover of the terminals (*pic. 4b*). Use proper spanner to unscrew all twelve female screws holding the front and rear parts of the entry panel together (*pic. 4c*), turn the panel over and carefully uncover the front part of the panel. Remove the original reader of the entry panel stuck to a pair of posts (*pic. 4d*). Connect the **C1** cable in the reader module and insert it to the empty position for a reader module, lead the **C1** cable along the right wall of the towards the opening in the upper part and further on out of the panel as shown in picture (*pic. 4e*). Cover the front part of the entry panel back, turn the panel over and use proper spanner to screw all twelve female screws for holding the front and rear parts of the panel back again (*pic. 4f*). Connect the wires of the **C1** cable to the contacts of the entry panel terminals (*pic. 3* – when using the power supply and REX device of the entry panel), or connect them according to required usage (e.g. direct door lock control). At last place the plastic cover of the entry panel terminals back and screw it with the cross-screws (*pic. 4g*).

4.5.2 Module removal

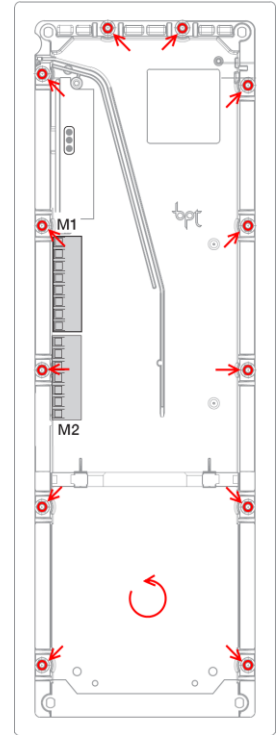
When removing the module use the procedure described in the previous chapter. Do not forget to unplug both entry panel and reader module from power supply first!



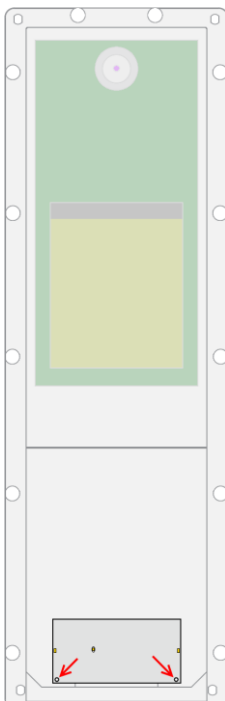
Pic. 4a



Pic. 4b



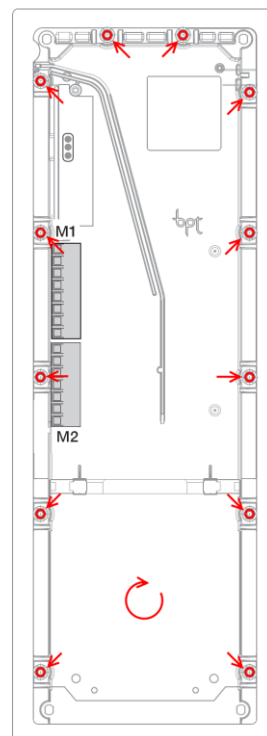
Pic. 4c



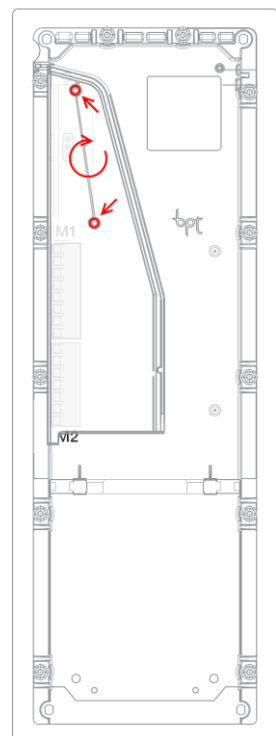
Pic. 4d



Pic. 4e



Pic. 4f



Pic. 4g

5 Setting parameters of the reader module

5.1 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 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 *NREM 59E* 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

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>