

MAŁKOWSKI MARTECH Czołowo, ul. Leśna 57, 62-035 Kórnik tel. +48 61 222 75 00 fax. +48 61 222 75 01 email: biuro@malkowski.pl, www.malkowski.pl	FIRE PROTECTION VERTICAL SLIDING DOOR type: MARC-O EI60	number: MM_O-1en
	FIRE PROTECTION DEVICE CHARACTERISTICS	revision: 2 01/2021

1. DEVICE REQUIREMENTS

1.1 GENERAL REQUIREMENTS

- fire protection doors are construction products defined in the EN 16034:2014-11 harmonised product reference standard. Therefore, they must be labelled with the “CE” mark, and the prerequisite for marketing them is the manufacturer’s obligation to issue a related Declaration of Performance which indicates their intended use in a building,
- the Declaration of Performance issued for fire protection doors should have parameters specified for at least one of the following essential fireproof product characteristics in compliance with the product reference standards, i.e. EN 16034:2014-11 and EN 13241+A2:2016-10:
 - fire resistance,
 - ability to release and durability of the ability to release,
 - self-closing,
 - durability of self-closing against degradation,
 - resistance to wind load;

1.2 REQUIREMENTS FOR BUILDING/INSTALLATION CONDITIONS

- possibility to install in construction partitions made of various materials,
- both indoor and outdoor application,
- possibility of corridor installation;

1.3 REQUIRED DEVICE PARAMETERS

- fire resistance class range as per PN-EN 13501-2:2016: **EI₁₃₀, EI₆₀, EI₁₂₀**,
- reaction to fire class as per PN-EN 13501-1:2019-02: **A1**,
- resistance to wind load as per PN-EN 12424:2002: **1, 2, 3 or 4**,
- use category (number of working cycles) as per EN 16034:2014-11: **C0, C1, C2, or C3**,
- anti-corrosion class as per PN-EN ISO 12944-2:2018: **C1, C2, C3, C4 or C5**,
- acoustic insulating power as per PN-EN ISO 717-1:2013: at least **25** dB, optionally up to **51** dB,
- thermal insulating power as per PN-EN 12428:2013-06: do **1,5** W/m²K,
- door leaf weight: up to **30** kg/m² for class EI60 and up to **40** kg/m² for class EI120;

1.4 REQUIREMENTS FOR DEVICE DESIGN/EQUIPEMENT

- possibility to manufacture with pass doors, also without a threshold,
- possibility to install a larger number of pass doors,
- possibility to manufacture in smoke-proof version class **S_a** and **S₂₀₀** as per PN-EN 13501-2:2016,
- possibility to manufacture as ex-proof version as per PN-EN, ATEX,
- the use an electric drive also with a gravitational closing system,
- the use of a mechanism for manual opening of high doors,
- possibility to connect a wide range of electric equipment such as fire alarm systems, door position monitoring, access control,
- possibility of locking the leaf in the closed position,
- door elements come with the possibility of finishing the surface in any colour from the RAL palette or come in a stainless version,
- the door manufacturer should provide an extended technical description of the device (in section 2 of this Fire Protection Device Characteristics) as well as the Application, Operation and Maintenance Manual to ensure correct and safe assembly, installation, operation, maintenance and disassembly;



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2. DEVICE DESCRIPTION

The fire protection vertical sliding door type MARC-O consists of the following basic components: door leaf, two sets of guides, a counterweight with cables and pulleys or belts and pulleys, and labyrinth sealing components.

The door leaf is 60 mm thick and comprises panels which can be 400 to 1200 mm in width, two side profiles, a bottom and top profile. Each door leaf panel is filled with rock wool panel type PRO_{MM}18, execution class A1 as per PN-EN 13501-1, minimum density of 170 kg/m³.

Inside the mineral wool filling, in the central portions of each panel, there are vertical steel bars, grade S235JR as per PN-EN 10025-2:2019-11, diameter 8,0 mm, with threaded ends, connecting the top profile with the bottom profile with M8 washers and nuts. On either side of a leaf, there are vertical galvanised steel sheets, grade DX51D+Z275 as per PN-EN 10346:2015-09, thickness 0,5 – 0,7 mm glued to each filling surface with an adhesive, catalogue number PRO_{MM}2, PRO_{MM}12 or O-PA.

The bottom and top profiles are joined with side profiles. The side and bottom profiles are made of purpose-profiled steel sheet which is 2 - 3 mm thick, grade DX51D+Z275 as per PN-EN 10346:2015-09. Two slide blocks are attached to the side profiles, along the entire height of each side profile, intumescent gaskets type PRO_{MM}15 are attached. The top profile assembly is a steel hollow section clad in fire-proof panels type PRO_{MM}3. The top profile is attached to a purpose-shaped closing profile, made of 2 mm thick steel sheet and lined with two layers of fire-proof panels type PRO_{MM}3. The door leaf is clad in steel sheets which are 0,5 – 0,7 mm thick, grade DX51D+Z275 as per PN-EN 10346:2015-09.

The door leaf runs in the guides installed on both sides of the structural opening. Each guide formed by a 3 - 5 mm thick steel profile, grade DX51D+Z275 as per PN-EN 10346:2015-09, attached to the load-carrying structure with a minimum fire resistance class of REI 30 or REI 60 for the EI 30 and EI 60 doors, respectively.

Type of the anchoring elements depends on wall structure.

Inside the guide's profiles are a guide runner profiles made of 1 - 2 mm thick galvanized steel sheet and attached to the guide way profiles by tack welding or self-tapping screws.

The door leaf can also run on bearing guide runners attached to the side profiles of the leaf. In this version, the inside of the structural profile of the guide way houses a steel channel bar which acts as the guide runner. The guides are protected with layers of fire-proof panels type PRO_{MM}3, which are additionally guarded with fascia trim pieces made of 0,5 – 0,7 mm steel sheet.

Along the installation opening and attached to the load-carrying structure are labyrinth seals with a maximum spacing of 500 mm, each labyrinth seal is made of 2 mm Z-shaped steel sheet profiles, grade DX51D+Z275 as per PN-EN 10346:2015-09, lined with fire-proof panels type PRO_{MM}3 for protection. Along the entire length of the labyrinth seal, an intumescent gasket type PRO_{MM}15 is attached.

The partition closure components thus include the purpose-formed side profiles of the door leaf and the closing profile attached to the leaf top steel profile, and the labyrinth seals attached along the partition opening.

The closing system of the door is formed by an electromagnetic holder, cable pulleys with steel cables or belt pulleys with belts, and counterweights. The counterweights are point-attached to the top steel profile of the door leaf with steel cables (with a minimum diameter of 4 mm) or with carrying belts. The electromagnetic holder is attached to the load-carrying structure above the door leaf. If triggered by a fire alarm input, the electromagnetic holder releases the door leaf for the latter to descend and seal off the opening. Once the fire alarm is cleared, the door is opened manually.

The door can optionally be provided with electrical drive units which, in the event of a fire alarm input, provides a controlled closing motion. Once the fire alarm is cleared, the door is opened by operating the electrical drive unit.

The door leaf can be optionally provided with single leaf hinged pass door with the leaf thickness of 60 mm. The pass door cladding is made from two suitably press-formed steel sheets, 0,5 – 0,7 mm thick. The door infill is made from mineral wool with a minimum density of 170 kg/m³, class A1 as per PN-EN 13501-1. The mineral wool infill is protected by fireproof panel strips along the vertical and lintel edges. The cladding steel sheets on both sides of the door are bonded with a fire-rated adhesive compound to the infill over the whole surface.

The pass door could be manufactured with or without a threshold.



3. DRAWINGS

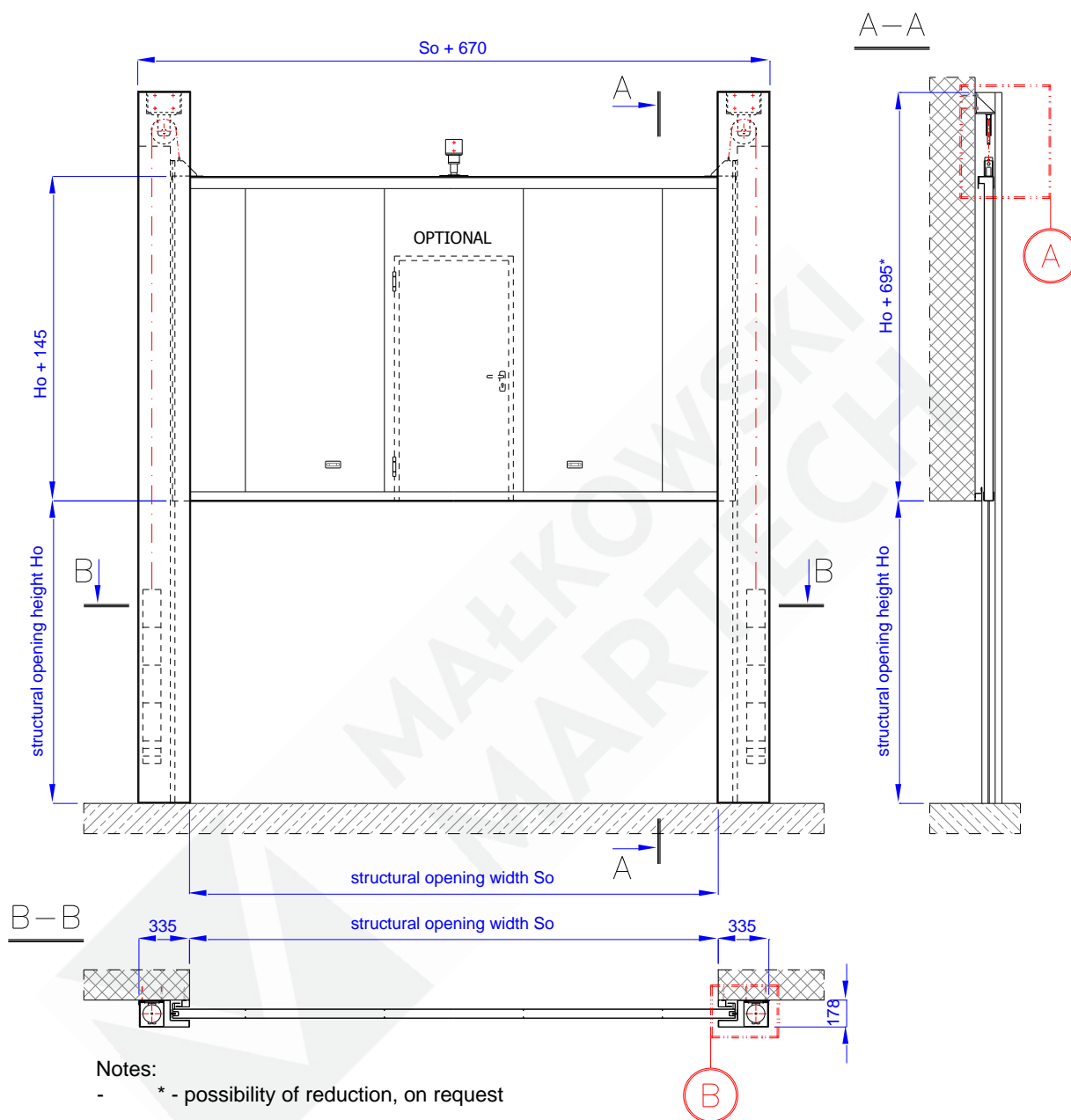


Fig. 1 – Fire protection vertically sliding door MARC-O EI60



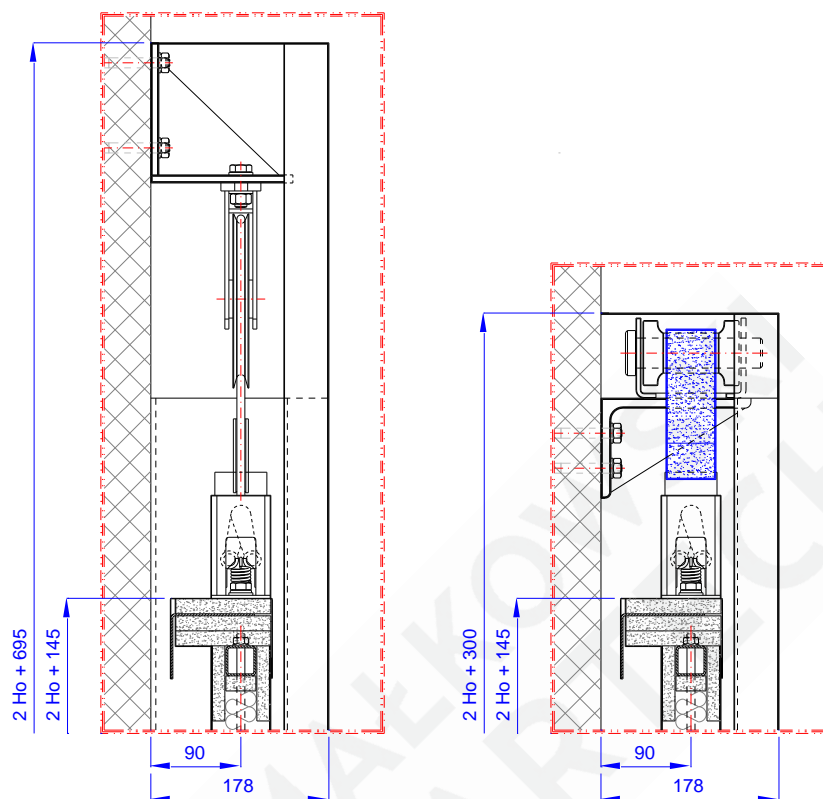


Fig. 2 – Detail A from Fig. 1 – variant with the cables on the left and with the belts on the right side

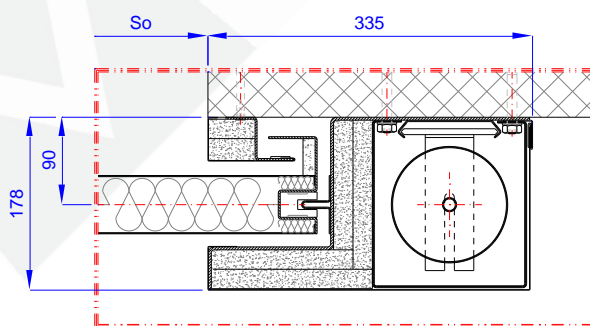


Fig. 3 – Detail B from Fig. 1



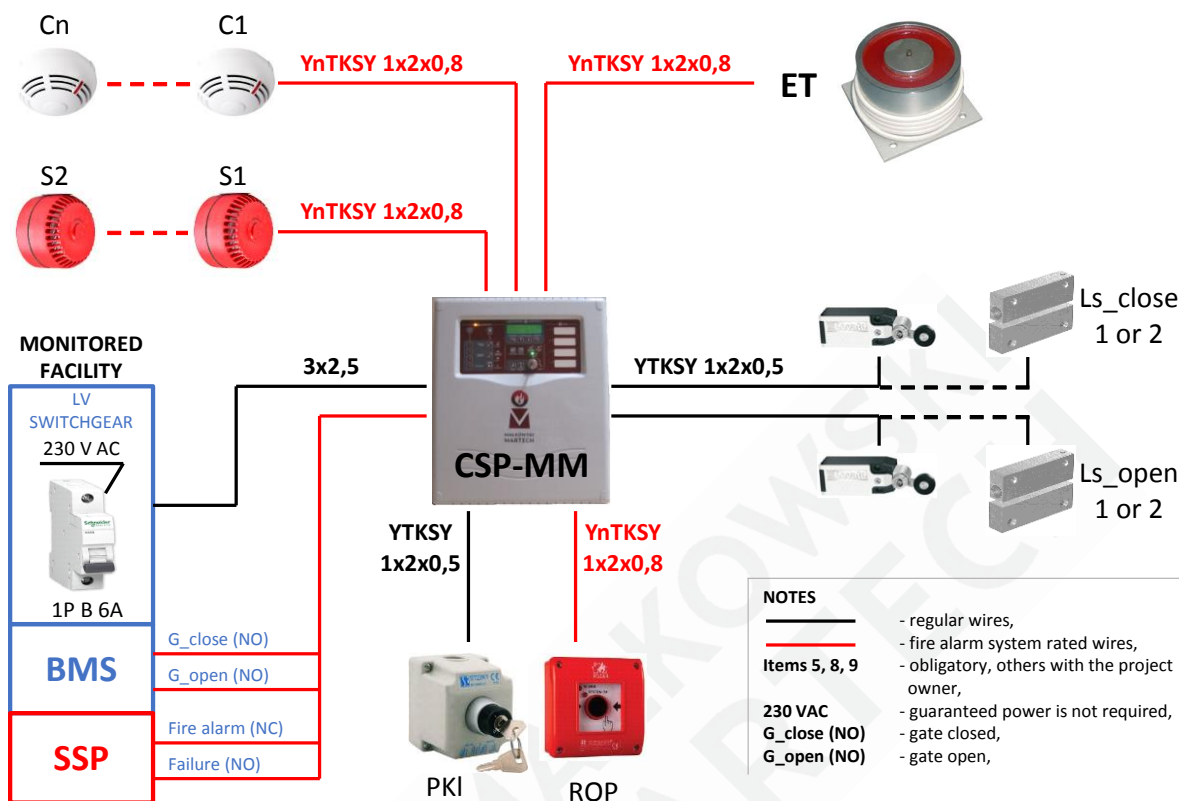
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4. DEVICE SPECIFICATION

Name	Fire protection vertically sliding door
Type	MARC-O
Fire-resistance class [as per PN-EN 13501-2:2016]	EI₂60
Reaction to fire class [as per PN-EN 13501-1:2019-02]	A1
Manufacturer	Małkowski-Martech S.A.
Certificate of Constancy of Performance	2434-CPR-0133
Operating manual document	Use, Operation and Maintenance Manual

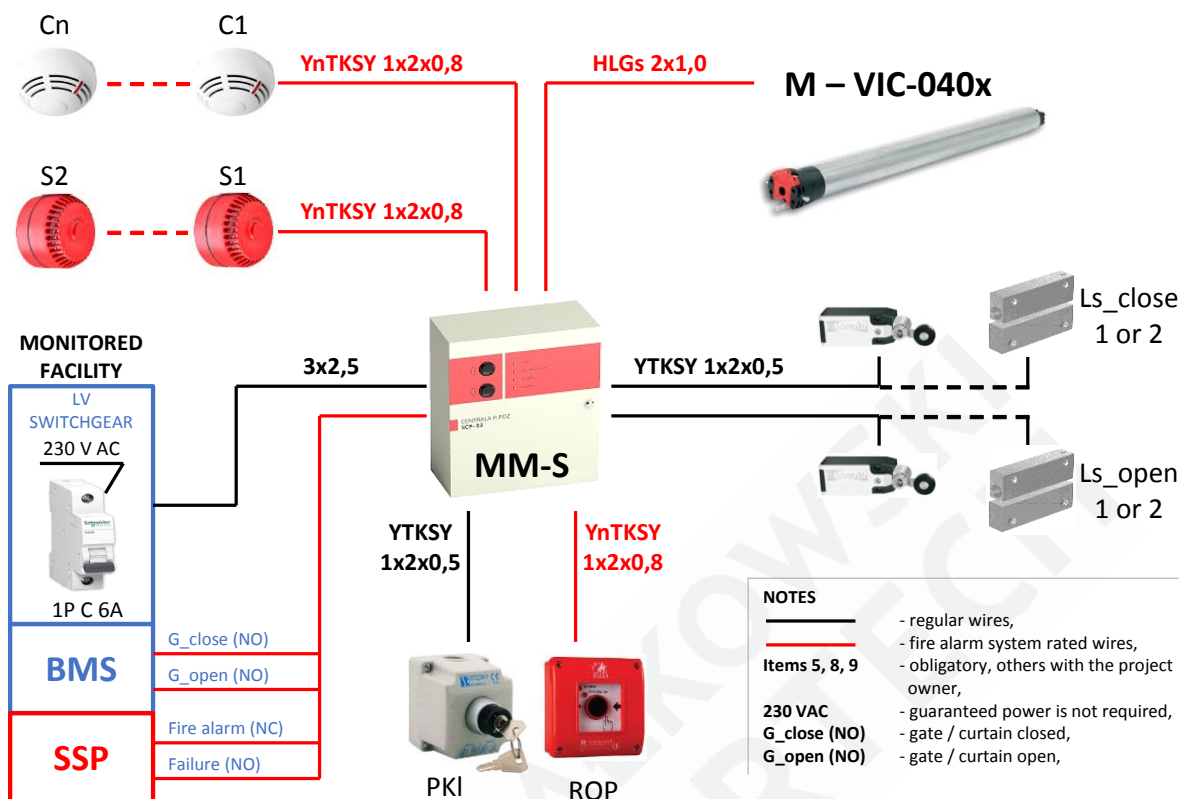
STRUCTURAL AND QUALITY-RELATED PARAMETERS	(S – standard, O – option, Z – on request)	
Leaf weight	30 [kg/m ²]	
Leaf thickness	60 [mm]	
Dimensions [clear opening, W x H]	< 15 000 x 6 000 [mm] > 15 000 x 6 000 [mm]	S O
Installation location	internal external [installed inside the building] external [installed on the building exterior]	S S O
Installation requirements	wall-mounted corridor-mounted [niche]	S S
Pass door [clear opening, W x H]	(900 - 1 200) x 2 000 [mm] > 1 200 x 2 000 [mm]	O O
Door / pass door fittings [as per PN-EN 179:2009, PN-EN 1125:2009]	handle / handle [active leaf] anti-panic fittings [panic bar, push bar] access control	S O O
Using category [as per EN 16034:2014-11]	C0 [1 – 499] C1 [500 – 9 999], C2 [10 000 – 49 999] C3 [50 000 – 99 999] C4 [100 000 – 199 999]	S O O Z
Resistance to wind load [as per PN-EN 12424:2002]	1 [≤ 300 Pa] 2 [≤ 450 Pa], 3 [≤ 700 Pa], 4 [≤ 1000 Pa]	S O
Anti-corrosion class [as per PN-EN ISO 12944-2:2018]	C1, C2, C3 C4, C5	S O
Smoke-proof version [as per PN-EN 13501-2:2016]	S _a , S ₂₀₀	Z
Acoustic insulating power [as per PN-EN ISO 717-1:2013]	R _w (C;C _{tr}) = 25 (-2;-3) [dB] R _w (C;C _{tr}) = 51 (-2;-6) [dB]	S O
Thermal insulating power [as per PN-EN 12428:2013-06]	0,75 [W/m ² K]	S
Ex-proof version [as per PN-EN, ATEX]	EX II 2G IIB T3 (T4)	Z
Stainless version [as per PN-EN ISO 10088-1]		O
Door leaf and covers colour	galvanized, RAL 7035, 9002, 9010 any RAL palette [not available with A1 class]	S O
Drive unit type [as a standard, the door is closed by the gravity due to the difference in weight of the leaf and counterweight, and opened manually]	electric 24 V DC [opening only] electric 24 V DC [closing / opening]	O O
Controller - fire alarm control panel [as per PN-EN 54-2:1997+AC:1999+A1:2006]	w/UPS, pre-wired with the field fire alarm system and/or local smoke/heat detectors	O
Electrical components [available only with a fire alarm control panel]	technical key switch electromagnetic holder detectors [smoke or heat, smoke and heat] signalling device [sounder, optical] leaf open and / or closed position sensor	S S O O O



5. ELECTRICAL DIAGRAM

Fig. 4 – MARC-O control system with electromagnetic holder

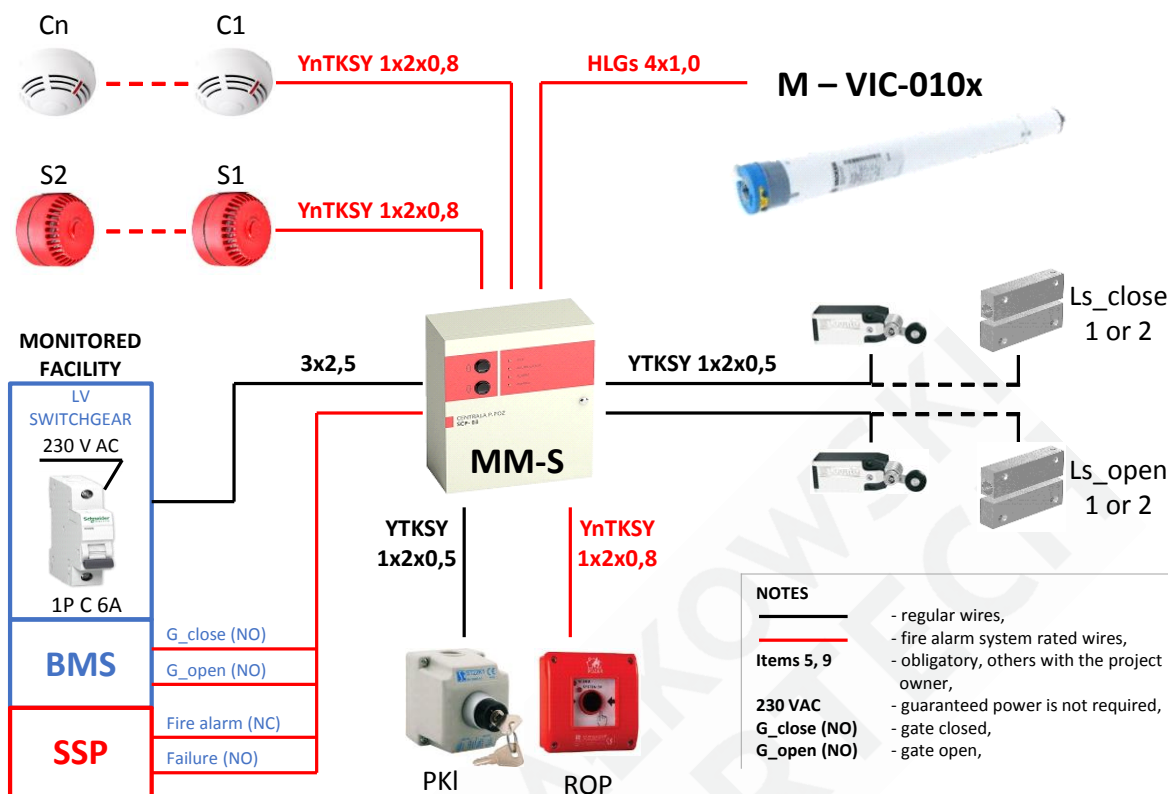
No.	Figure item code	Item type	Item name	Item code	Rec. qty	Notes
1	C1 - Cn	point fire detector	optical smoke detector	DRP-100	2	model DRP-100, is recommended, max. 32 pcs.
			class A1R heat detector	DCP-100	2	
			some and heat	DMP-100	2	
2	C1 - Cn	detector receptable	standard fire detector receptacle	DB100	2	qty = detector qty
3	ROP	manual call point	standard manual call point	ROP-100/PL	1	max. 10 pcs.
4	S1, S2	signalling device	fire alarm sounder, low base	SPP-100	1	max. 2 lines
5	ET	electromagnetic holder	land holder	EM-xxxx	2	
6	Ls_close	limit switch „1” mag. sensor „2”	mechanical limit switch, magnetic reed relay switch	KB F1 S11 MS-240-S45	1	application option, selection 1 or 2
7	Ls_open	limit switch „1” mag. sensor „2”	mechanical limit switch, magnetic reed relay switch	KB F1 S11 MS-240-S46	1	
8	PKI	key switch	key switch operated K1 control box	SP22K1/07-1	1	
9	CSP-MM	controller	standard fire alarm control panel	CSP-MM 1(2)	1	




Fig. 5 – MARC-O control system with 24 V DC drive unit

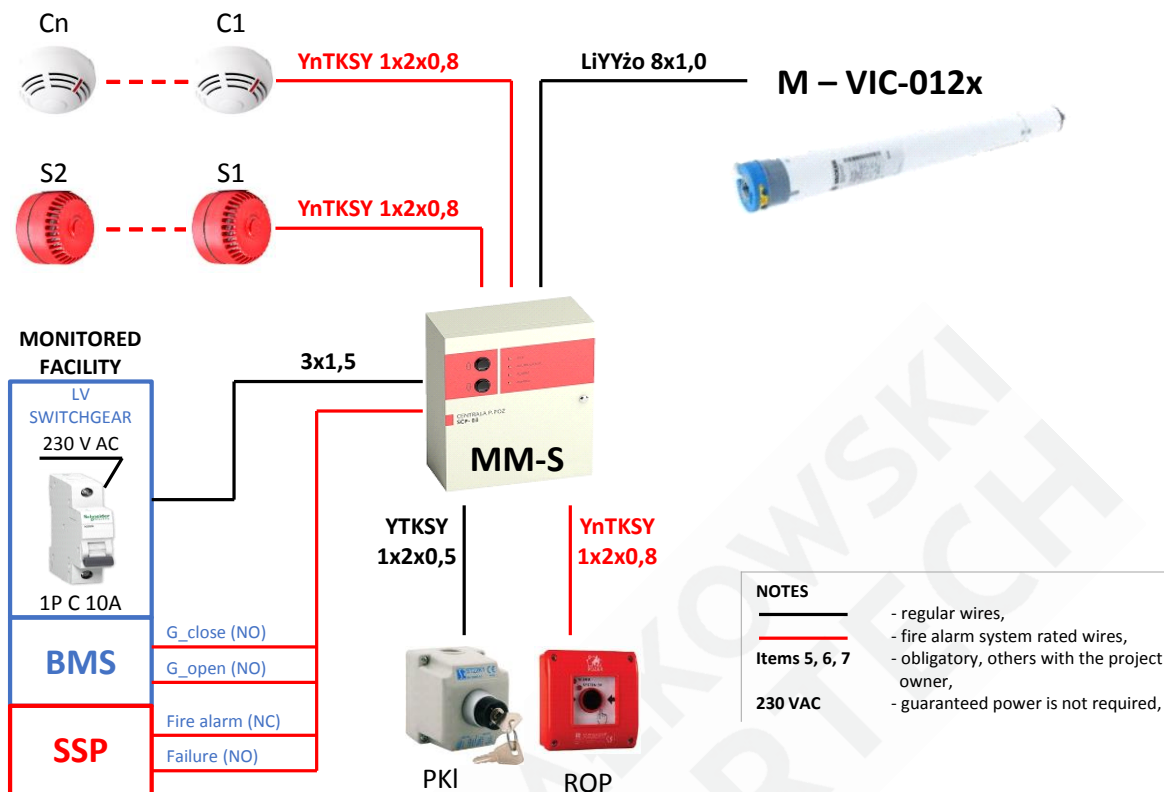
No.	Figure item code	Item type	Item name	Item code	Rec. qty	Notes
1	C1 - Cn	point fire detector	optical smoke detector	ID100	2	model ID100, is recommended, max. 6 pcs.
			class A1R heat detector	ID200	2	
			some and heat	ID300	2	
2	C1 - Cn	detector receptacle	standard fire detector receptacle	EB0010	2	qty = detector qty
3	ROP	manual call point	standard manual call point	ROP OP1	1	max. 10 pcs.
4	S1, S2	signalling device	fire alarm sounder, low base	SPP-100	1	max. current 200 mA
5	M	electric drive	Internal (tubular)	VIC-040x	1	
6	Ls_close	limit switch „1” mag. sensor „2”	mechanical limit switch, magnetic reed relay switch	KB F1 S11 MS-240-S45	1	application option, selection 1 or 2
7	Ls_open	limit switch „1” mag. sensor „2”	mechanical limit switch, magnetic reed relay switch	KB F1 S11 MS-240-S46	1	application option, selection 1 or 2
8	PKI	key switch	key switch operated K1 control box	SP22K1/07-1	1	
9	MM-S	controller	standard fire alarm control panel	MM-S	1	




Fig. 6 – MARC-O control system with 24 V DC drive unit

No.	Figure item code	Item type	Item name	Item code	Rec. qty	Notes
1	C1 - Cn	point fire detector	optical smoke detector	ID100	2	model ID100, is recommended, max. 6 pcs.
			class A1R heat detector	ID200	2	
			some and heat	ID300	2	
2	C1 - Cn	detector receptable	standard fire detector receptacle	EB0010	2	qty = detector qty
3	ROP	manual call point	standard manual call point	ROP OP1	1	max. 10 pcs.
4	S1, S2	signalling device	fire alarm sounder, low base	SPP-100	1	max. current 200 mA
5	M	electric drive	Internal (tubular)	VIC-010x	1	
6	Ls_close	limit switch „1” mag. sensor „2”	mechanical limit switch, magnetic reed relay switch	KB F1 S11 MS-240-S45	1	application option, selection 1 or 2
7	Ls_open	limit switch „1” mag. sensor „2”	mechanical limit switch, magnetic reed relay switch	KB F1 S11 MS-240-S46	1	application option, selection 1 or 2
8	PKI	key switch	key switch operated K1 control box	SP22K1/07-1	1	
9	MM-S	controller	standard fire alarm control panel	MM-S	1	




Fig. 7 – MARC-O control system with 230 V AC drive unit (gravity closing)

No.	Figure item code	Item type	Item name	Item code	Rec. qty	Notes
1	C1 - Cn	point fire detector	optical smoke detector	ID100	2	model ID100, is recommended, max. 6 pcs.
			class A1R heat detector	ID200	2	
			some and heat	ID300	2	
2	C1 - Cn	detector receptable	standard fire detector receptacle	EB0010	2	qty = detector qty
3	ROP	manual call point	standard manual call point	ROP OP1	1	max. 10 pcs.
4	S1, S2	signalling device	fire alarm sounder, low base	SPP-100	1	max. current 200 mA
5	M	electric drive	Internal (tubular)	VIC-012x	1	
6	PKI	key switch	key switch operated K1 control box	SP22K1/07-1	1	
7	MM-S	controller	standard fire alarm control panel	MM-S	1	

