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 BUIDING/INSTALLATION CONDITIONS

- possibility to install in construction partitions made of various materials,
- low height of the lintel required to be installed,
- both indoor and outdoor application,
- possible assembly in tandem with a gate/shutter without fire resistance capability,
- in the case of outdoor location, possibility of mounting on spacer brackets to avoid disassembling the building thermal insulation layer;

1.3 REQUIRED DEVICE PARAMETERS

- fire resistance class range as per PN-EN 13501-2:2016: **EW120/E120**, **EW60/E120**, **EW60/E90**,
- 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**,
- anti-corrosion class as per PN-EN ISO 12944-2:2018: **C1**, **C2**, **C3**, **C4** or **C5**,
- curtain weight: up to **2** kg/m^2;

1.4 REQUIREMENTS FOR DEVICE DESIGN/EQUIPEMENT

- curtain door elements come with the possibility of finishing the surface in any colour from the RAL palette or come in a stainless version,
- possibility to design curtain door (of smaller dimensions) with a thermal fuse trigger instead of an electric drive and detectors connected to the SAP system,
- doors with a thermal fuse trigger must be equipped with a system / protection (cushioning-retracting spring) to prevent the curtain from dropping too rapidly, so as not to pose a risk of an injury,
- possibility to connect a wide range of electric equipment such as fire alarm systems, curtain position monitoring, access control,
- in case the curtain is mechanically damaged, it should be possible to repair/regenerate it without dismantling the entire curtain shaft with the leaf,
- the curtain 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;

2. DEVICE DESCRIPTION

The fire protection curtain door type MARC-K consists of the following basic components: curtain, guides, curtain shaft, shaft brackets and VIC type drive.

The curtain of MARC-K is made of horizontally arranged textile strips, part no. $K_{MM}1$. The individual textile strips are connected one to another with an overlap along the horizontal edges with three rows of stitching spaced every 10 mm, stitching thread part no. $K_{MM}2$. A vertical overlapping joining of the textile strips is feasible with the stitching technique as explained above. The curtain length is designed so that the bottom edge of the curtain is in contact with the sill surface with the curtain completely unrolled. The curtain surface is not tensioned and there is a length of the curtain left wound on the curtain shaft equal to least one and a half turn of the curtain shaft. The curtain hangs loose from the curtain shaft when unwound. The curtain is fastened to the shaft by a steel slat made of galvanized steel sheet, grade DX51D+Z275 as per PN-EN10346:2015-09, the steel slat is 1,5 mm thick and ST6,3 self-tapping steel screws as per PN-EN ISO 15482:2002, spaced up to 50 cm. Along the bottom curtain edge is a bottom ballast profile made of galvanized steel sheet profiles, grade DX51D+Z275 as per PN-EN10346:2015-09, which are 0,7 – 1,0 mm thick.

A compensation gap is placed in the centre of the ballast profile. Along both vertical edges of the curtain, there are textile strips 100 mm width, type $K_{MM}3$ sewn (and folding in mid-width onto both sides of the curtain) with two rows of stitching spaced 10 mm, stitching thread type $K_{MM}2$. The edge textile strips are running between the outer and inner parts of the side guide. On both edge textile strips sewn along the vertical edges of the curtain are the curtain guide runners installed with M6 hex-head screws, wide washers and M6 hex nuts, with the maximum curtain runner spacing of 50 cm.

The curtain shaft is made of steel, 88,9 mm in diameter, 3,6 mm in wall thickness, with both ends carrying steel necks, each 20 mm in diameter. The curtain shaft is installed on steel brackets with steel bearings. Both curtain shaft brackets are made from galvanized steel sheet, grade DX51D+Z275 as per PN-EN10346:2015-09, 4,0 mm thick.

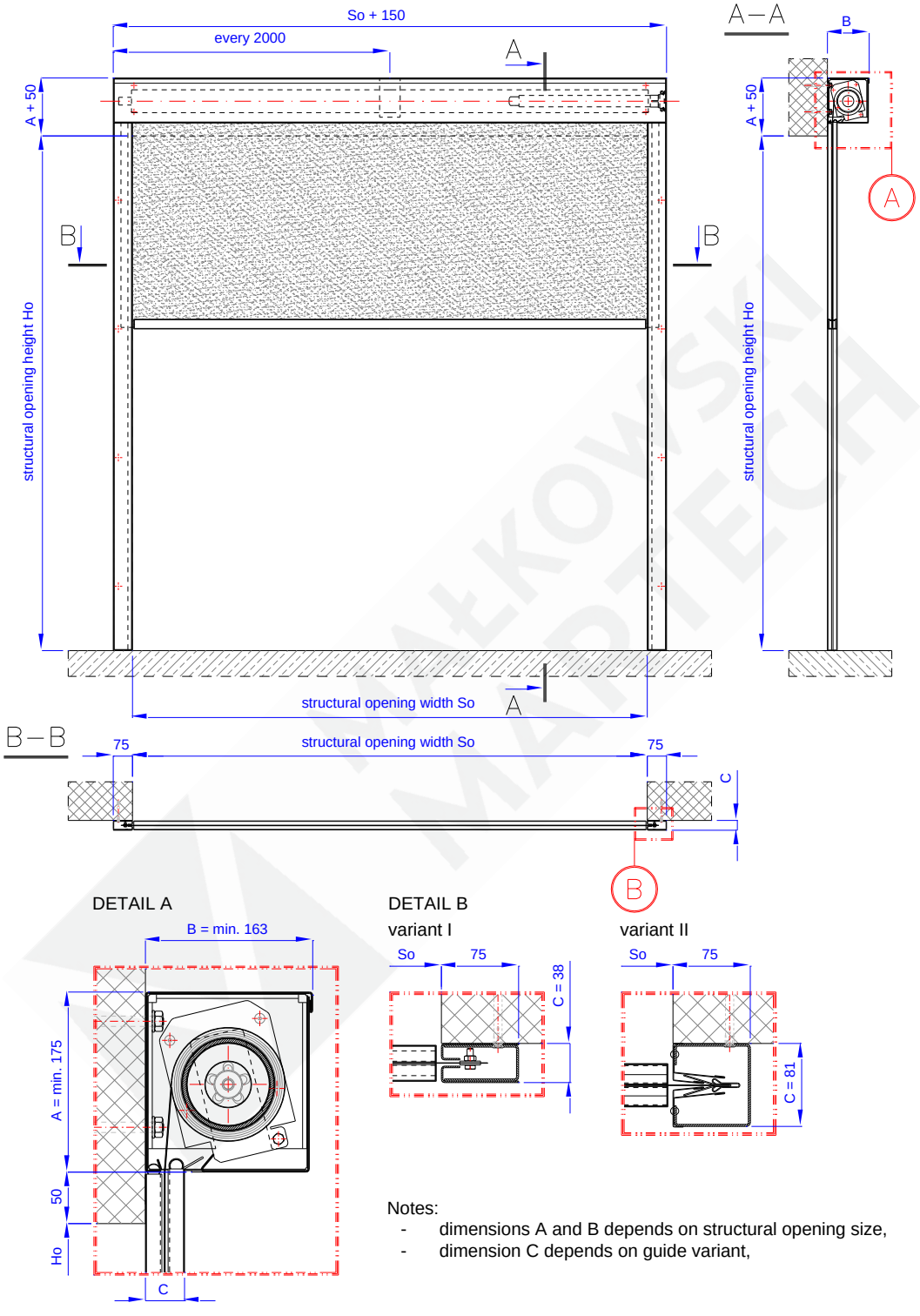
The front and rear trim components are attached to the curtain shaft brackets with dia. 4.0 mm steel rivets. The front and rear trim components are made from purpose-profiled galvanized steel sheets, grade DX51D+Z275 as per PN-EN10346:2015-09, 1,0 mm thick. The curtain guides are formed by main profiles, which are purpose-profiled galvanized steel sheets, grade DX51D+Z275 as per PN-EN10346:2015-09, 2,0 mm thick. Dia. 4,0 mm steel rivets, spaced up to 20 cm, attach the outer and inner guide runners to the main profiles. The guides runners are made from purpose-profiled galvanized steel sheets, 1,5 mm thick.

For fire protection curtains doors with drive units, the curtain is wound on the curtain shaft and held open by the drive unit. When a controller is triggered by the field fire alarm system, the curtain descends to close the opening clearance.

For fire protection curtains doors with spring release gears, the curtain is wound on the curtain shaft and held open by a thermal fuse (a fusible lock). When exposed to a temperature of approx. 74°C, the fusible lock melts and releases the curtain to seal off access to the fire zone.

An advantage of the fire protection curtain is its easy rolling up in the event of inadvertent descent of the curtain, plus an easy and safe operating method. The fire protection curtain is stopped by detents integrated with the curtain guide ways.

3. DRAWINGS



Notes:
- dimensions A and B depends on structural opening size,
- dimension C depends on guide variant,

Fig. 1 – Fire protection curtain door MARC-K

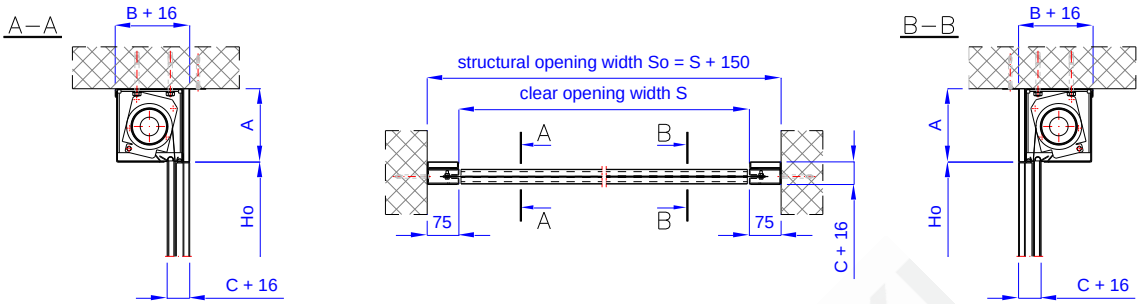


Fig. 2 – Fire protection curtain door MARC-K, corridor (niche) mounting
- no lintel and both reveal

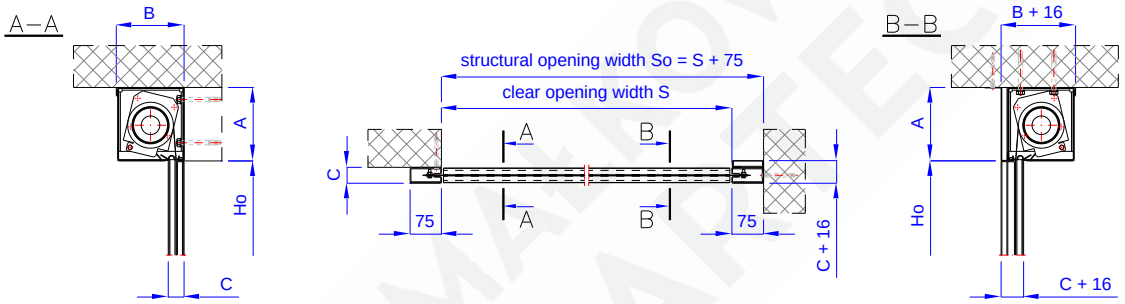


Fig. 3 – Fire protection curtain door MARC-K, mixed mounting
- no lintel and reveal on the right side

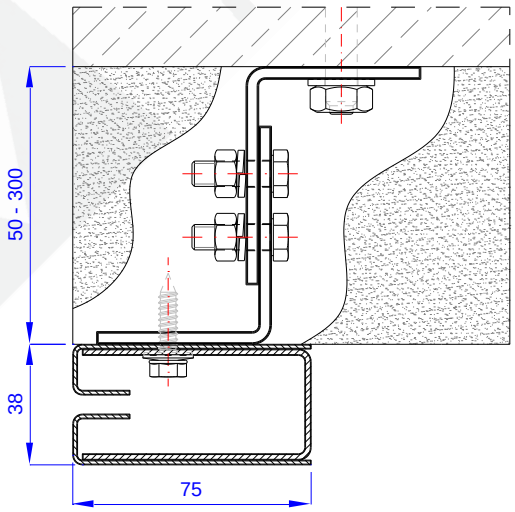


Fig. 4 – Guides mounted on spacer brackets – intermediate installation

4. DEVICE SPECIFICATION

Name	**Fire protection curtain door**
Type	**MARC-K**
Fire-resistance class [as per PN-EN 13501-2:2016]	**EW120 / E120**, **EW60 / E120**, **EW60 / E90**
Manufacturer	**Małkowski-Martech S.A.**
Certificate of Constancy of Performance	**2434-CPR-0097**
Operating manual document	**Use, Operation and Maintenance Manual**

STRUCTURAL AND QUALITY-RELATED PARAMETERS	(**S** – *standard*, **O** – *option*, **Z** – on request*)*	
Curtain weight	**1,9** [kg/m^2]	
Curtain thickness	**1,5** [mm]	
Dimensions [clear opening, W x H]	< **5 000** x **5 000** [mm] (**5 000** do **10 000**) x **10 000** [mm] > **10 000** x **10 000** [mm]	**S** O Z
Minimum lintel clear height	**225** [mm]	**S**
Installation location	**internal** **external** [installed inside the building] **external** [installed on the building exterior]	**S** **S** O
Installation requirements	**wall-mounted / ceiling-suspended** **hallway installation** [recessed] **mixed installation** [recessed wall mounting] **intermediate installation** [mounted on spacers]	**S** **S** **S** **S**
Tandem installation	**with a non-fire-rated gate / curtain**	O
Using category [as per EN 16034:2014-11]	**C0** [1 – 499] **C1** [500 – 9 999]**, C2** [10 000 – 49 999]	**S** O
Resistance to wind load [as per PN-EN 12424:2002]	**1** [≤ 300 Pa] **2** [≤ 450 Pa]	**S** O
Anti-corrosion class [as per PN-EN ISO 12944-2:2018]	**C1**, **C2, C3** **C4**, **C5**	**S** O
Stainless version [as per PN-EN ISO 10088-1]		Z
Enclosure and guide colour	**galvanized** **RAL 7035**, **9002**, **9010** **any RAL palette**	**S** **S** O
Drive unit type [the application feasibility of specific drive units depends on the door size]	**electric** [internal] **gravitational - with thermal fuse trigger** [up to **2500** x **3000** opening size]	**S** **S**
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] **leaf open and/or closed position sensor** **signalling device** [sounder, optical]	**S** O O O O

5. ELECTRICAL DIAGRAM

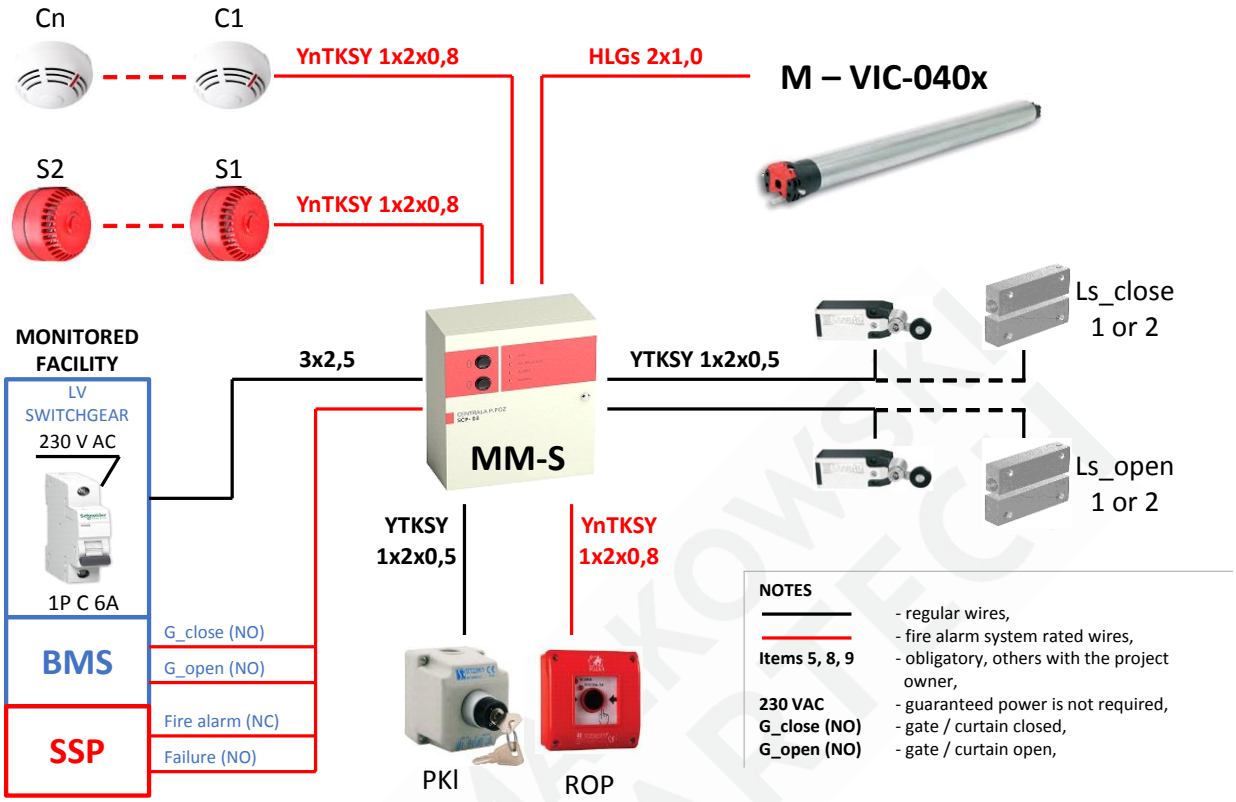


Fig. 5 – MARC-K control system with internally-mounted 24 V DC drive unit

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-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	
8	PKl	key switch	key switch operated K1 control box	SP22K1/07-1	1	
9	MM-S	controller	standard fire alarm control panel	MM-S	1	