

# PMA

CABLE PROTECTION

电缆保护



June 2007

## PMA EX-SYSTEM

ATEX approved Cable Protection System

瑞士比玛牌防爆电缆保护系统  
通过 ATEX 认证

# ATEX 95



## Polyamide Cable Protection: 30 years of experience, now ATEX 95 certified

## 聚酰胺电缆保护: 三十余年行业经验, 通过 ATEX 95 认证

- Products for the protection of cables, wires and hoses against not only mechanical damage but also the influences of UV radiation, weathering and chemicals.
- Products made of specially modified, load discharging Polyamide materials (PA11, PA12) for use in explosion endangered zones 1 / 21 (gas / dust)
- ATEX marking:
- 防护电缆及电线免受机械冲击, 紫外线照射, 气候影响, 化学腐蚀等引起的损伤和损坏。
- 由具有电荷释放功能的特殊改良聚酰胺 (PA11, PA12) 材料制成, 适用于危险区域 1 / 21 (气体 / 粉尘)
- 通过 ATEX 认证

## CE 1258 II 2G Ex e I ISEV 05 ATEX 0105II 2D Ex tD

- Identical in function to PMAFIX/FLEX standard range (a product of PMA the cable protection specialist with 30 years experience in railway, machinery and automation applications)
- Two system sealing systems fulfilling IP66 or IP68
- System safety: For security reasons opening is only possible with the use of a screwdriver.
- Flexible conduits, excellent for applications with continual reversed bending.
- Quick and simple installation, reduced total installation costs (compared to other explosion-proof cable protection systems)
- No corrosion, long service time Low weight
- 基本功能符合 PMAFIX/FLEX (PMA 的一个产品系列, PMA 是电缆保护的专家, 在铁路, 机器设备, 自动化应用领域有 30 余年应用经验)
- 两个密封系统, 防护等级可达 IP66 或 IP68
- 安全设计: 出于安全考虑, 需要使用螺丝刀拆卸接头
- 软管柔韧性极佳, 适用于长期交变弯曲要求的场合。
- 安装简便快捷, 方便经济
- 非腐蚀材料, 使用寿命长 重量轻



	<b>ESX</b>	<b>Conduit</b> Polyamide 11 very flexible, medium-wall	<b>软管</b> 聚酰胺11 很柔软, 中壁	<b>Page</b>  4
	<b>END</b> <b>ENV</b>	<b>Connector straight</b> Polyamide 12 Polyamide 12 with metal thread	<b>直型接头</b> 聚酰胺12 聚酰胺 12 金属螺纹	<b>6</b> <b>8</b>
	<b>EAD</b> <b>EAV</b>	<b>Connector 45° elbow</b> Polyamide 12 Polyamide 12 with metal thread	<b>45°接头</b> 聚酰胺12 聚酰胺 12 金属螺纹	<b>6</b> <b>9</b>
	<b>EWD</b> <b>EWV</b>	<b>Connector 90° elbow</b> Polyamide 12 Polyamide 12 with metal thread	<b>90°弯头</b> 聚酰胺12 聚酰胺 12 金属螺纹	<b>7</b> <b>9</b>
	<b>EBD</b> <b>EBV</b>	<b>Connector 90° curved elbow</b> Polyamide 12 Polyamide 12 with metal thread	<b>90°曲线弯头</b> 聚酰胺12 聚酰胺 12 金属螺纹	<b>7</b> <b>9</b>
	<b>ENZ</b>	<b>Connector straight with strain relief</b> Polyamide 12 with metal thread	<b>直型, 消除应力接头</b> 聚酰胺 12 金属螺纹	<b>8</b>
	<b>EYD</b> <b>EYR</b>	<b>Y Piece</b> Polyamide 12 Polyamide 12	<b>Y型三通</b> 聚酰胺 12 聚酰胺 12	<b>10</b> <b>10</b>
	<b>ENR-RE</b> <b>ESGD</b> <b>ESGR</b>	<b>Conduit Connection</b> to solid metal tubes, Polyamide 12 Connection splice, Polyamide 12 Connection splice, Polyamide 12	<b>管接头</b> 连接钢管, 聚酰胺 12 软管联接接头, 聚酰胺 12 软管联接接头, 聚酰胺 12	<b>10</b> <b>10</b> <b>10</b>
	<b>EH-0</b>	<b>System Support for conduits</b> Polyamide 12, one-piece with integrated safety clip	<b>软管固定夹</b> 聚酰胺12 带集成安全夹设计	<b>11</b>
	<b>EPS</b>	<b>System Support for conduits</b> Polyamide 12, one-piece, stackable and suitable for high loads	<b>软管固定夹</b> 聚酰胺12, 单个软管重载固 定夹子	<b>11</b>

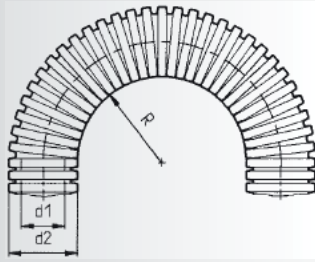
**Conduits**
**软管**

The PMA EX-system is suitable for the protection of cables, wires and hoses against mechanical damage, UV-radiation and weathering in explosion endangered areas classified as zones 1/21 (gas/dust) according to ATEX 137.

PMA EX-system 电缆保护系统通过 ATEX 137 认证, 适用于危险区域 1/21 (气体/粉尘), 可保护电缆及电线免受机械冲击, 紫外线照射, 气候影响等引起的损伤和损坏。

The conduit offers electrostatic load discharging properties and comes with a range of compatible ATEX approved fittings and installation accessories.

软管和同样通过 ATEX 认证的接头和安装附件配合使用, 具有电荷释放特性。

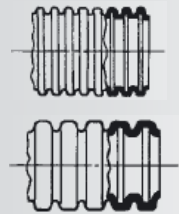


\*\* stat. R = lowest recommended bending radius for static (fixed) installation.

\*\* stat. R = 静态安装最小弯曲半径

\*\*\* dyn. R = lowest recommended bending radius for dynamic (flexible) installation.

\*\*\* dyn. R = 动态安装最小弯曲半径


**ESX highly flexible, medium-wall**
**ESX 极柔软, 中壁**

The PMA Ex-System conduit type ESX offers very good flexibility and can be used for applications with highest dynamic requirements. Excellent UV and weathering resistance allow outdoor installation exposed to constant sunlight.

ESX系列防爆软管具有极好的柔软性, 可应用于极端动态场合。具有极佳的抗紫外线特、耐候性能, 适合在室外安装, 可承受长期日光照射。



ESX- 指标

min. \_\_\_\_\_ max.

ductility 柔软性

fatigue / reversed bending 抗腐蚀性

pressure resistance 抗压性

cold temperature performance 抗冻性

cold temperature performance 耐候性

- Specially modified electrostatic discharging polyamide
- Free from halogens and cadmium, very good UV-resistance
- Highest dynamic load capacity
- **Temperature range:** -50 °C to +90° C (material limits)  
-20 °C to +85 °C (for ATEX use)
- Chemical resistance: To fuels, mineral oils, fats, alkalis, acids and bases etc.

特殊改良聚酰胺制成, 可释放静电电荷  
自熄灭性好, 不含卤素和镉  
极佳的动态负载能力

温度范围: -50°C 至 90°C (材料)  
-20°C 至 +80°C (ATEX 标准)

Order No. black 订货号 黑色	Conduit size NW 软管尺寸 NW	Conduit size Metric 软管尺寸 公制	Inside Diameter 内径	Outside Diameter 外径	stat.** / dyn.*** Radius 静态 / 动态 最小弯曲半径	PU Meter 包装单位
ESXT-10B	10	12	9.2	13.0 mm	20 / 50 mm	50
ESXT-12B	12	16	11.8	15.8 mm	30 / 70 mm	50
ESXT-17B	17	20	16.0	21.2 mm	35 / 80 mm	50
ESXG-17B	17	20	15.2	21.2 mm	35 / 85 mm	50
ESXG-23B	23	25	21.7	28.5 mm	40 / 110 mm	30
ESXG-29B	29	32	27.4	34.4 mm	50 / 130 mm	30
ESXG-36B	36	40	35.8	42.4 mm	60 / 180 mm	30
ESXG-48B	48	50	46.7	54.5 mm	70 / 220 mm	30

## Connectors

The PMA Ex-System connectors together with PMA Ex-System protection conduits are used for flexible protection of cables, wires and hoses against mechanical damage, UV-radiation and weathering in explosion endangered areas classified as zones 1/21 (gas/dust) according to ATEX 137.

Connectors are available with ingress protection up to and including IP66 or IP68.

IP66 connectors are fitted with a pre-installed universal safety clip which ensures a quick "push-in" installation of the conduit.

IP68 connectors for increased requirements will be delivered with a special conduit sealing cap.

## 接头

PMA EX-system 接头配合软管使用，通过 ATEX 137 认证，适用于危险区域 1/21（气体/粉尘），可保护电缆及电线免受机械冲击，紫外线照射，气候影响等引起的损伤和损坏。

防护等级有 IP66 和 IP68 可选。

IP66 管接头预先安装一个通用安全夹，可确保迅速插入连接。

如果防护要求需要提高，可选用带软管密封圈的管接头，防护等级可达到 IP68。



### IP66 static IP54 dynamic

- One piece fitting, conical sealing method
- Easy "push-in" installation
- Pre-installed safety clip AFN2
- Fits any type of conduit profile (T and G)
- Excellent pull-out strength
- Re-opening for safety reasons only possible with a screwdriver

### IP66 静态系统，IP54 动态系统

一体化设计管接头，锥形密封  
“推入”式简易安装方式  
预安装 AFN2 安全夹子  
适合于任何波纹类型的软管（细波纹和粗波纹）  
优秀的抗拉能力  
只可用螺丝刀才可以拆卸，确保安全。

IP66



### IP68 static IP67 dynamic

- High sealing through additional seal cap
- For highest dynamic applications
- Fits any type of conduit profile (T and G)
- Excellent pull-out strength
- Re-opening for safety reasons only possible with a screwdriver

### IP68 静态系统，IP67 动态系统

附加密封圈，高度密封  
适合最高动态应用  
适合于任何波纹类型的软管（细波纹和粗波纹）  
优秀的抗拉能力  
只可用螺丝刀才可以拆卸，确保安全。

IP68





- Specially modified electrostatic discharging polyamide
- Self-extinguishing, free from halogens and cadmium
- Excellent impact strength
- **Temperature range:** -50 °C to +90° C (material limits)  
-20 °C to +85 °C (for ATEX use)

特殊改良聚酰胺制成,可释放静电荷

自熄灭性好,不含卤素和镉

极佳的抗冲击强度

温度范围: -50°C至90°C(材料)

-20°C至+80°C (ATEX 标准)

### END straight, metric

### END 直型,公制

These PMA Ex-System connectors allow a quick "push-in" installation of the PMA Ex-System conduits.

配合 PMA 防爆系统软管, 推入式简易安装

Order No. IP66 订货号 IP66	Thread metric 螺纹 公制	Fits to conduit size		Thread length 螺纹 长度	Overall length 总长度
		NW	metric		
		适合软管尺寸	公制		
<b>BEND-M120GT</b>	M12x1.5	10	12	11.0 mm	36.5 mm
<b>BEND-M160GT</b>	M16x1.5	10	12	11.0 mm	36.5 mm
<b>BEND-M162GT</b>	M16x1.5	12	16	11.0 mm	39.5 mm
<b>BEND-M202GT</b>	M20x1.5	12	16	11.0 mm	39.5 mm
<b>BEND-M207GT</b>	M20x1.5	17	20	11.0 mm	47.5 mm
<b>BEND-M257GT</b>	M25x1.5	17	20	12.0 mm	48.5 mm
<b>BEND-M253GT</b>	M25x1.5	23	25	12.0 mm	52.5 mm
<b>BEND-M323GT</b>	M32x1.5	23	25	15.0 mm	55.5 mm
<b>BEND-M329GT</b>	M32x1.5	29	32	15.0 mm	56.0 mm
<b>BEND-M409GT</b>	M40x1.5	29	32	19.0 mm	60.0 mm
<b>BEND-M406GT</b>	M40x1.5	36	40	19.0 mm	72.5 mm
<b>BEND-M506GT</b>	M50x1.5	36	40	19.0 mm	72.0 mm
<b>BEND-M508GT</b>	M50x1.5	48	50	19.0 mm	72.5 mm
<b>BEND-M638GT</b>	M63x1.5	48	50	19.0 mm	72.0 mm



- Specially modified electrostatic discharging polyamide
- Self-extinguishing, free from halogens and cadmium
- Excellent impact strength
- **Temperature range:** -50 °C to +90° C (material limits)  
-20 °C to +85 °C (for ATEX use)

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温度范围: -50°C至90°C(材料)

-20°C至+80°C (ATEX 标准)

### EAD 45° elbow, metric

### EAD 45°弯头,公制

These PMA Ex-System connectors allow a quick "push-in" installation of the PMA Ex-System conduits.

配合 PMA 防爆系统软管, “推入式”简易安装

Order No. IP66 订货号 IP66	Thread metric 螺纹 公制	Fits to conduit size		Thread length 螺纹 长度	External dimensions 外部尺寸
		NW	metric		
		适合软管尺寸	公制		
<b>BEAD-M120GT</b>	M12x1.5	10	12	11.0 mm	43.5 x 37.0 mm
<b>BEAD-M160GT</b>	M16x1.5	10	12	11.0 mm	43.5 x 38.0 mm
<b>BEAD-M162GT</b>	M16x1.5	12	16	11.0 mm	48.0 x 40.0 mm
<b>BEAD-M202GT</b>	M20x1.5	12	16	11.0 mm	48.0 x 41.5 mm
<b>BEAD-M207GT</b>	M20x1.5	17	20	11.0 mm	55.5 x 51.5 mm
<b>BEAD-M253GT</b>	M25x1.5	23	25	12.0 mm	65.0 x 58.5 mm
<b>BEAD-M329GT</b>	M32x1.5	29	32	15.0 mm	73.5 x 66.5 mm
<b>BEAD-M406GT</b>	M40x1.5	36	40	19.0 mm	92.5 x 85.5 mm
<b>BEAD-M506GT</b>	M50x1.5	36	40	19.0 mm	92.5 x 89.5 mm
<b>BEAD-M508GT</b>	M50x1.5	48	50	19.0 mm	100.0 x 96.0 mm
<b>BEAD-M638GT</b>	M63x1.5	48	50	19.0 mm	100.0 x 104.0 mm

IP66

IP66

**EBD 90° curved elbow, metric**

These PMA Ex-System connectors allow a quick “push-in” installation of the PMA Ex-System conduits.

**EBD 90° 曲线弯头,公制**

配合 PMA 防爆系统软管, 推入式简易安装

Order No. IP66 订货号 IP66	Thread metric 螺纹 公制	Fits to conduit size		Thread length 螺纹 长度	External dimensions 外部尺寸
		NW	metric 适合软管尺寸 公制		
BEED-M207GT	M20x1.5	17	20	11.0 mm	47.5 x 73.0 mm
BEED-M257GT	M25x1.5	17	20	12.0 mm	48.5 x 76.0 mm
BEED-M253GT	M25x1.5	23	25	12.0 mm	57.5 x 83.0 mm
BEED-M323GT	M32x1.5	23	25	15.0 mm	61.0 x 87.5 mm
BEED-M329GT	M32x1.5	29	21	15.0 mm	70.5 x 93.0 mm
BEED-M409GT	M40x1.5	29	32	19.0 mm	74.5 x 98.5 mm
BEED-M406GT	M40x1.5	36	40	19.0 mm	85.0 x 121.0 mm
BEED-M506GT	M50x1.5	36	40	19.0 mm	85.0 x 125.0 mm
BEED-M508GT	M50x1.5	48	50	19.0 mm	98.5 x 130.0 mm
BEED-M638GT	M63x1.5	48	50	19.0 mm	98.5 x 138.0 mm



- Specially modified electrostatic discharging polyamide
- Self-extinguishing, free from halogens and cadmium
- Excellent impact strength
- **Temperature range:** -50 °C to +90° C (material limits)  
-20 °C to +85 °C (for ATEX use)

特殊改良聚酰胺制成,可释放静电荷

自熄灭性好,不含卤素和镉

极佳的抗冲击强度

温度范围: -50°C至90°C(材料)

-20°C至+80°C (ATEX 标准)

**EWD 90° elbow, metric**

These PMA Ex-System connectors allow a quick “push-in” installation of the PMA Ex-System conduits.

**EWD 90° 曲线弯头,公制**

配合 PMA 防爆系统软管, 推入式简易安装

Order No. IP66 订货号 IP66	Thread metric 螺纹 公制	Fits to conduit size		Thread length 螺纹 长度	External dimensions 外部尺寸
		NW	metric 适合软管尺寸 公制		
BEWD-M120GT	M12x1.5	10	12	11.0 mm	34.0 x 39.5 mm
BEWD-M160GT	M16x1.5	10	12	11.0 mm	34.0 x 40.5 mm
BEWD-M162GT	M16x1.5	12	16	11.0 mm	38.5 x 46.0 mm
BEWD-M202GT	M20x1.5	12	16	11.0 mm	38.5 x 47.5 mm



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-20 °C to +85 °C (for ATEX use)

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自熄灭性好,不含卤素和镉

极佳的抗冲击强度

温度范围: -50°C至 90°C(材料)

-20°C至+80°C (ATEX 标准)



- Specially modified electrostatic discharging polyamide
- Strain relief socket made of nickel-plated brass, sealing insert TPE-V
- With corresponding seals IP68 static / IP67 dynamic cable = IP68 (10 bar)
- Self-extinguishing, free from halogens and cadmium
- Excellent impact strength
- Extremely high thread and system connection strength
- **Temperature range:** -50 °C to +90° C (material limits)  
-20 °C to +85 °C (for ATEX use)
- **Content of delivery:**  
Complete: Fitting with oval clips (OVN2), Pflitsch sealing insert (DE), conduit seal (NEN3), O-ring (OR)

特殊改良聚酰胺制成,可释放静电荷

黄铜镀镍螺纹, TPV-E 密封塞

带相应密封圈 IP68 静态/IP67 动态

电缆夹紧处 IP68 (10bar)

自熄灭性好,不含卤素和镉

极佳的抗冲击强度

极高的螺纹和系统连接强度

温度范围: -50°C至 90°C(材料)

-20°C至+80°C (ATEX 标准)

包括配件:

整套: 椭圆形夹子 (OVN2), Pflitsch 密封塞 (DE), 密封圈 (NEN3), O 型圈 (OR)

### ENV straight, metric

The metal thread and the sealing up to IP68 allow to use these PMA Ex-System fittings in applications with increased requirements.

### ENV 直型, 金属螺纹, 公制, IP68

金属螺纹以及可达到 IP68 的密封性能, 通常用于增强性要求的场合。

Order No. IP68 订货号 IP68	Thread metric 螺纹 公制	Fits to conduit size 适合软管尺寸		Thread length 螺纹 长度	Overall length 总长度
		NW	metric 公制		
NENV-M120-10	M12x1.5	10	12	10.0 mm	40.0 mm
NENV-M160-10	M16x1.5	10	12	10.0 mm	40.0 mm
NENV-M162-10	M16x1.5	12	16	10.0 mm	43.0 mm
NENV-M202-10	M20x1.5	12	16	10.0 mm	43.0 mm
NENV-M207-10	M20x1.5	17	20	10.0 mm	51.0 mm
NENV-M257-11	M25x1.5	17	20	11.0 mm	52.0 mm
NENV-M253-11	M25x1.5	23	25	11.0 mm	54.0mm
NENV-M323-13	M32x1.5	23	25	13.0 mm	56.0 mm
NENV-M329-13	M32x1.5	29	32	13.0 mm	57.3 mm
NENV-M409-13	M40x1.5	29	32	13.0 mm	57.3 mm
NENV-M406-13	M40x1.5	36	40	13.0 mm	71.4mm
NENV-M506-14	M50x1.5	36	40	14.0 mm	72.4 mm
NENV-M508-14	M50x1.5	48	50	14.0 mm	72.4 mm
NENV-M638-14	M63x1.5	48	50	14.0 mm	72.4 mm

### ENZ straight with strain relief, metric

The metal thread and the sealing up to IP68 allow to use these PMA Ex-System fittings in applications with increased requirements. Due to the integrated Pflitsch insert, cables are held and at the same time sealed up to IP68 (10 bar). Furthermore, these connectors can especially be used where damp and dry areas have to be separated.

### ENZ 直型, 消除应力, 公制

金属螺纹, 防护等级达到 IP68, 通常用于高要求的场合。归功于内置 Pflitsch 密封塞, 电缆夹紧处密封等级也达到 IP68 (10bar)。此类接头常用于干湿区域, 需要分隔的场合。

Order No. IP68 订货号 IP68	Terminal range 夹紧范围	Thread metric 螺纹 公制	Fits to conduit size 适合软管尺寸		Thread length 螺纹 长度	External dimensions 外部尺寸
			NW	metric 公制		
NENZ-M120S/P1	4.5 - 6.0 mm	M12x1.5	10	12	5.0 mm	48.5 mm
NENZ-M120S/P2	5.0 - 8.0 mm	M12x1.5	10	12	5.0 mm	48.5 mm
NENZ-M120S/P3	6.5 - 9.5 mm	M12x1.5	10	12	5.0 mm	48.5 mm
NENZ-M160S/P1	4.0 - 6.5 mm	M16x1.5	10	12	6.0 mm	49.5 mm
NENZ-M160S/P2	5.0 - 8.0 mm	M16x1.5	10	12	6.0 mm	49.5 mm
NENZ-M160S/P3	6.5 - 9.5 mm	M16x1.5	10	12	6.0 mm	49.5 mm
NENZ-M202S/P1	4.0 - 6.5 mm	M20x1.5	12	16	6.5 mm	54.0 mm
NENZ-M202S/P3	6.5 - 9.5 mm	M20x1.5	12	16	6.5 mm	54.0 mm
NENZ-M202S/P4	7.0 - 10.5 mm	M20x1.5	12	16	6.5 mm	54.0 mm
NENZ-M207S/P3	6.5 - 9.5 mm	M20x1.5	17	20	6.5 mm	60.0 mm
NENZ-M207S/P4	7.0 - 10.5 mm	M20x1.5	17	20	6.5 mm	60.0 mm
NENZ-M207S/P5	9.0 - 13.0 mm	M20x1.5	17	20	6.5 mm	60.0 mm
NENZ-M257S/P5	9.0 - 13.0 mm	M25x1.5	17	20	7.5 mm	61.5 mm
NENZ-M257S/P6	11.5 - 15.5 mm	M25x1.5	17	20	7.5 mm	61.5 mm
NENZ-M323S/P4	14.0 - 18.0 mm	M32x1.5	23	25	8.0 mm	73.0 mm
NENZ-M323S/P5	17.0 - 20.5 mm	M32x1.5	23	25	8.0 mm	73.0 mm
NENZ-M409S/P4	20.0 - 25.0 mm	M40x1.5	29	32	8.0 mm	73.0 mm
NENZ-M409S/P5	24.0 - 28.0 mm	M40x1.5	29	32	8.0 mm	73.0 mm
NENZ-M506S/P1	27.0 - 32.0 mm	M50x1.5	36	40	10.0 mm	89.5 mm
NENZ-M506S/P3	32.0 - 36.0 mm	M50x1.5	36	40	10.0 mm	89.5 mm
NENZ-M508S/P2	32.0 - 36.0 mm	M50x1.5	48	50	10.0 mm	92.0 mm
NENZ-M508S/P3	36.0 - 40.0 mm	M50x1.5	48	50	10.0 mm	92.0 mm
NENZ-M638S/P1	35.0 - 40.0 mm	M63x1.5	48	50	10.0 mm	90.5 mm
NENZ-M638S/P2	39.0 - 44.0 mm	M63x1.5	48	50	10.0 mm	90.5 mm

metal thread, IP68

**EAV 45° elbow, metric**

The metal thread and the sealing up to IP68 allow to use these PMA Ex-System fittings in applications with increased requirements.

**EAV 45° 弯头, 金属螺纹, 公制, IP68**

金属螺纹以及可达到 IP68 的密封性能, 通常用于高要求的场合。

Order No. IP68 订货号 IP68	Thread metric 螺纹 公制	Fits to conduit size		Thread length 螺纹 长度	External dimensions 外部尺寸
		NW	metric 适合软管尺寸 公制		
NEAV-M120-10	M12x1.5	10	12	10.0 mm	48.5 x 37.0 mm
NEAV-M162-10	M16x1.5	12	16	10.0 mm	53.0 x 40.5 mm
NEAV-M207-10	M20x1.5	17	20	10.0 mm	60.5 x 51.5 mm
NEAV-M257-11	M25x1.5	17	20	11.0 mm	61.5 x 54.5 mm
NEAV-M253-11	M25x1.5	23	25	11.0 mm	70.0 x 60.5 mm
NEAV-M323-13	M32x1.5	23	25	13.0 mm	72.0 x 64.5 mm
NEAV-M329-13	M32x1.5	29	32	13.0 mm	77.0 x 68.0 mm
NEAV-M409-13	M40x1.5	29	32	13.0 mm	77.0 x 73.0 mm
NEAV-M406-13	M40x1.5	36	40	13.0 mm	94.0 x 87.5 mm
NEAV-M506-14	M50x1.5	36	40	14.0 mm	95.0 x 92.5 mm
NEAV-M508-14	M50x1.5	48	50	14.0 mm	102.0 x 101.0 mm
NEAV-M638-14	M63x1.5	48	50	14.0 mm	102.0 x 104.0 mm

**EBV 90° curved elbow, metric**

The metal thread and the sealing up to IP68 allow to use these PMA Ex-System fittings in applications with increased requirements.

**EBV 90° 曲线弯头, 金属螺纹, 公制**

金属螺纹以及可达到 IP68 的密封性能, 通常用于高要求的场合。

Order No. IP68 订货号 IP68	Thread metric 螺纹 公制	Fits to conduit size		Thread length 螺纹 长度	External dimensions 外部尺寸
		NW	metric 适合软管尺寸 公制		
NEBV-M207-10	M20x1.5	17	20	10.0 mm	51.0 x 73.0 mm
NEBV-M257-11	M25x1.5	17	20	11.0 mm	52.0 x 76.0 mm
NEBV-M253-11	M25x1.5	23	25	11.0 mm	62.5 x 85.0 mm
NEBV-M323-13	M32x1.5	23	25	13.0 mm	64.5 x 89.0 mm
NEBV-M329-13	M32x1.5	29	32	13.0 mm	74.0 x 94.5 mm
NEBV-M409-13	M40x1.5	29	32	13.0 mm	75.5 x 100.5 mm
NEBV-M406-13	M40x1.5	36	40	13.0 mm	86.5 x 123.0 mm
NEBV-M506-14	M50x1.5	36	40	14.0 mm	87.5 x 130.0 mm
NEBV-M508-14	M50x1.5	48	50	14.0 mm	100.5 x 135.0 mm
NEBV-M638-14	M63x1.5	48	50	14.0 mm	100.5 x 138.0 mm

**EWV 90° elbow, metric**

The metal thread and the sealing up to IP68 allow to use these PMA Ex-System fittings in applications with increased requirements.

**EWV 90° 弯头, 金属螺纹, 公制**

金属螺纹以及可达到 IP68 的密封性能, 通常用于增强性要求的场合。

Order No. IP68 订货号 IP68	Thread metric 螺纹 公制	Fits to conduit size		Thread length 螺纹 长度	External dimensions 外部尺寸
		NW	metric 适合软管尺寸 公制		
NEWV-M120-10	M12x1.5	10	12	10.0 mm	37.5 x 39.5 mm
NEWV-M160-10	M16x1.5	10	12	10.0 mm	37.5 x 41.5 mm
NEWV-M162-10	M16x1.5	12	16	10.0 mm	42.0 x 46.5 mm
NEWV-M202-10	M20x1.5	12	16	10.0 mm	42.0 x 49.0 mm



- Specially modified electrostatic discharging polyamide
- Self-extinguishing, free from halogens and cadmium
- Excellent impact strength
- **Temperature range:** -50 °C to +90° C (material limits)  
-20 °C to +85 °C (for ATEX use)

特殊改良聚酰胺制成, 可释放静电电荷  
自熄灭性好, 不含卤素和镉  
极佳的抗冲击强度  
温度范围: -50°C至90°C(材料)  
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### ENR-REM Connection to solid metal tube

With these products solid metal tubes can easily and quickly be connected with flexible PMA Ex-System conduits. The connection is fixed onto the solid tube with a jubilee clip made of stainless steel.

### ENR-REM 连接钢管的管接头

此类管接头,带有镀锌钢夹子,可以将 PMA 软管与钢管简单、快速地连接在一起。

Order No. without jubilee clip 订货号 无联接螺旋夹	Order No. with jubilee clip 订货号 有联接螺旋夹	conduit size NW	Fits to metal tube metric		External dimensions 外部尺寸
			NW	公制	
BENR-REM162	BENR-REM162-24	12	M16	54.0 mm	
BENR-REM207	BENR-REM207-28	17	M20	65.0 mm	
BENR-REM253	BENR-REM253-32	23	M25	71.0 mm	
BENR-REM329	BENR-REM329-44	29	M32	71.0 mm	
BENR-REM406	BENR-REM406-50	36	M40	90.0 mm	
BENR-REM508	BENR-REM508-65	48	M50	90.0 mm	

### ESGD/ESGR Splice Connector

These PMA connection splices are used for an optimum connection of PMA Ex-System conduits and enable a highest grade of safety and sealing

### ESGD/ESGR 软管连接管接头

此类管接头,适用于 PMA EX-system 软管的连接,安全可靠,密封良好。

Order No. IP66 订货号 IP66	Order No. IP68 订货号 IP68	Fits to conduit size		External dimensions 外部尺寸
		NW	metric 公制	
BESGD-1212GT	BESGR-1212	12	16	66.0 mm
BESGD-1717GT	BESGR-1717	17	20	89.0 mm
BESGD-2323GT	BESGR-2323	23	25	103.0 mm
BESGD-2929GT	BESGR-2929	29	32	100.0 mm
BESGD-3636GT	BESGR-3636	36	40	130.0 mm
BESGD-4848GT	BESGR-4848	48	50	136.0 mm

### EYD/EYR Y Piece

These PMA Ex-System junctions allow the splitting of cable looms and rerouting of the split looms into different directions.

### EYD/EYR Y 型三通管接头

此类管接头,布线时,适用于分配电缆的走位与分线。

Order No. IP66 订货号 IP66	Order No. IP68 订货号 IP68	Input Fits to conduit size		Output Fits to conduit size	
		NW	metric 公制	NW	metric 公制
BEYD-121010GT	BEYR-121010	12	16	10	12
BEYD-171212GT	BEYR-171212	17	20	12	16
BEYD-231717GT	BEYR-231717	23	25	17	20
BEYD-292323GT	BEYR-292323	29	32	23	25
BEYD-362929GT	BEYR-362929	36	40	29	32
BEYD-483636GT	BEYR-483636	48	50	36	40

### EH-O System Support, one-piece

The one-piece PMA Ex-System support is designed for the fixation of PMA Ex-System corrugated conduits in explosion endangered zones 1/21 (gas/dust) according to ATEX 137.

### EH-0 单个软管固定卡子

单个软管固定卡子特别为 PME EX-system 软管设计, 适用于危险区域 1/21 (气体/粉尘), 符合 ATEX 137 认证。

Order No. IP68 订货号 IP68	Fits to conduit size		Dimensions Width x Height x Depth 尺寸 宽度 x 高度 x 深度	Fixing screw 固定螺钉
	NW	metric		
	适合软管尺寸	公制		
BEH-10-0	10	12	20.5 x 24.5 x 20.0 mm	1 x M5
BEH-12-0	12	16	24.0 x 27.0 x 20.0 mm	1 x M5
BEH-17-0	17	20	30.0 x 34.0 x 20.0 mm	1 x M6
BEH-23-0	23	25	38.5 x 42.0 x 20.0 mm	1 x M6
BEH-29-0	29	32	45.5 x 48.0 x 20.0 mm	1 x M6
BEH-36-0	36	40	55.5 x 56.0 x 20.0 mm	1 x M6
BEH-48-0	48	50	67.5 x 68.0 x 20.0 mm	1 x M6



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### EPS System Support, one-piece

The one-piece system supports offer clasps for easy pre-mounting and final assembly, fixation on standard rails type C and strain relief due to gripping around the conduit. In addition these products are partially stackable.

### EPS 固定夹子

整个夹子便于安装和拆卸, 夹紧软管可以消除应力, 亦可安装在 C 型钢轨上, 产品还可以部分叠加安装。

Order No. IP68 订货号 IP68	Fits to conduit size		Dimensions Width x Height x Depth 尺寸 宽度 x 高度 x 深度
	NW	metric	
	适合软管尺寸	公制	
BEPS-17	17	20	70.0 x 51.0 x 30.0 mm
BEPS-23	23	25	70.0 x 51.0 x 30.0 mm
BEPS-29	29	32	85.0 x 65.0 x 30.0 mm
BEPS-36	36	40	85.0 x 65.0 x 30.0 mm
BEPS-48	48	50	115.0 x 92.5 x 30.0 mm



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### MM Hexagonal Lock Nuts, metric, metal

These hexagonal lock nuts are suitable for a wide range of applications. Maximum possible torques guarantee a safe connection of the system.

### MM 六角型锁紧螺母, 公制螺纹, 金属

这种六角型锁紧螺母适用范围广。扭转力矩大, 保证连接安全可靠。

Order No. metal 订货号 金属	Fits to thread metric 适合螺纹 公制	Wrench Size 拧紧 尺寸	Dimensions Height 尺寸 高度
GMM-M12	M12x1.5	15.0 mm	2.8 mm
GMM-M16	M16x1.5	19.0 mm	3.0 mm
GMM-M20	M20x1.5	24.0 mm	3.5 mm
GMM-M25	M25x1.5	30.0 mm	4.0 mm
GMM-M32	M32x1.5	36.0 mm	5.0 mm
GMM-M40	M40x1.5	46.0 mm	5.0 mm
GMM-M50	M50x1.5	60.0 mm	5.0 mm
GMM-M63	M63x1.5	70.0 mm	6.0 mm

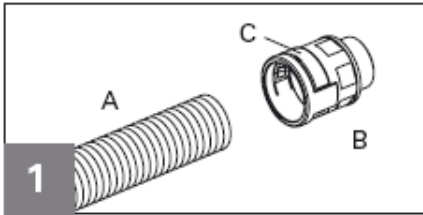


- Brass galvanically nickel-plated

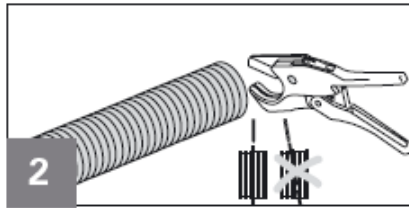
黄铜镀镍合金制成

# IP66

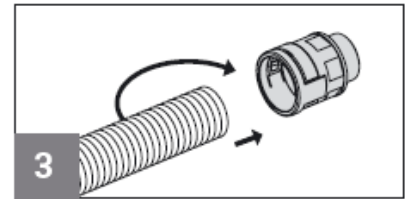
## Installation of IP66 Safety System (pat.) 对IP66系统的安装



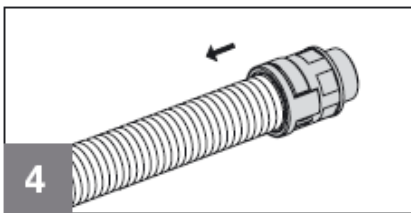
A. Conduit                      A. 软管  
B. Fitting                        B. 接头  
C. Universal safety clip      C. 通用安全型夹子



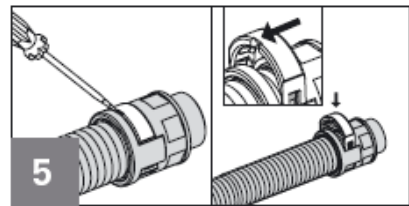
Straight cut of conduit (A).      垂直剪切软管 (A)



Push in the conduit (A) 将软管 (A) 推入接头, with a slight twist until 推入时轻微转动直至不能 the stop. 推入为止



Pull back the conduit (A) 轻微回拉软管 (A), 以确 slightly to ensure the 保锁紧 locking mechanism is fully engaged.



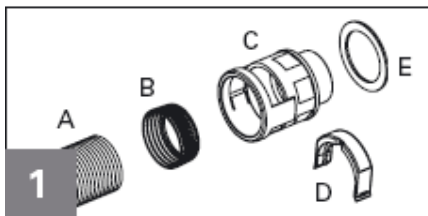
To re-open use a screwdriver. 使用螺丝刀开启接头。 The screwdriver slot at the oval clip (C) 确保椭圆形夹子 (C) 的 缺口部位位于软管一侧。 must point towards the conduit.



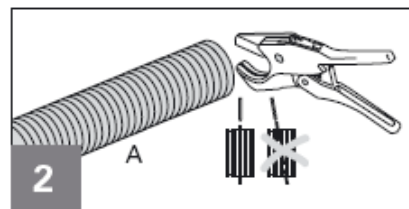
If bending the conduit, 如果软管需弯曲, 则请保 please keep to the 持在软管的推荐弯曲半径 recommended bending radius. 范围内。

# IP68

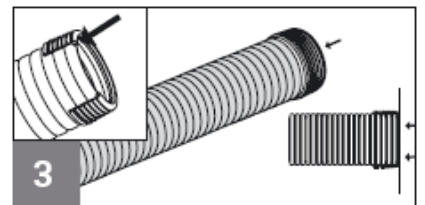
## Installation of IP68 Safety System (pat.) 对IP68系统的安装



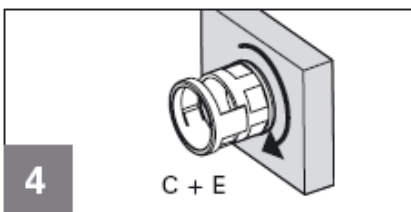
A. Conduit                      A. 软管  
B. Ex Seal cap (yellow)      B. Ex 密封帽 (黄色)  
C. Fitting                        C. 接头  
D. Oval clip                      D. 椭圆形夹子  
E. Thread seal (O-ring or flat seal)      E. 螺纹密封垫圈 (O型圈或扁平垫圈\*)



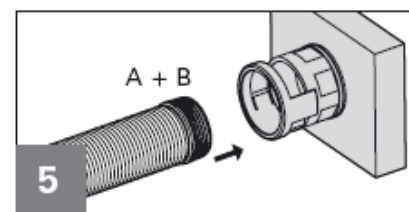
Straight cut of conduit (A).      垂直剪切软管 (A)



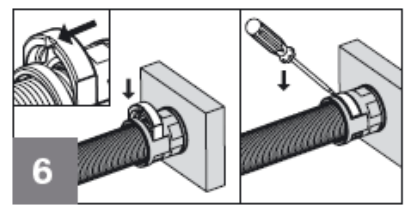
Push seal cap (B) 将密封帽(B)安装与软管 completely onto conduit 末端, 完全推入, 以达到 IP68. IP68的防护等级。



Place seal (E) onto fitting 将扁平垫圈 (E) 放置在 接头螺纹 (C) 处, 后旋 入箱体。



Push conduit with seal cap (A+B) 将带密封帽的软管 (A+B) 完全推入接头, 直至 in the fitting until seal cap 在锁 is no more visible in the 紧装置的长方形窗口看 locking element window. 不见密封帽为止。



Insert Oval clip (D) in the 将椭圆形夹子 (D) 推入 locking element window 锁紧装置窗口, 直至完全 and click into place. The 配合。确保椭圆形夹子 screwdriver slot must 的 缺口部位位于软管 one. 须用螺丝刀开启缺口 re-open use a screwdriver.

## Area of Application

The products constitute an equipment group II category 2G device in accordance with Directive 94/9/EC (ATEX 95) Appendix I which may be implemented in zones 1 / 2 as well as in gas groups IIA, IIB and IIC which are subject to explosion risk due to combustible substances, in accordance with Directive 99/92/EC (ATEX 137). The requirements in accordance with EN 60079-14 shall be adhered to on use/installation.

The products constitute an equipment group II category 2D device in accordance with Directive 94/9/EC (ATEX 95) Appendix I which may be implemented in zones 21 / 22 with explosive air/dust mixtures in accordance with Directive 99/92/EC (ATEX 137). The requirements in accordance with EN 50281-1-1 shall be adhered to on use/installation.

## Operation, Service, Maintenance

The defined ambient and operating temperature range is -20°C to +85 °C (temperature range for electrical equipment in accordance with EN 60079-0, formerly EN 50014).

A visual examination of the cable protection system shall be performed in periodic maintenance of systems and components, but no later than every 5 years. In the event of visible damage (holes, cracks, signs of heavy wear) to conduits, fittings or accessories, the damaged parts shall be replaced. (In the event of apparent mechanical damage, it shall be ensured that no incorrect handling takes place.)

Only ATEX-approved original PMA parts shall be used for the replacement of ATEX-approved parts.

These operating and assembly instructions include important information for service and maintenance and should therefore be retained.

## Assembly

To ensure the discharge of electrical currents and thus to ensure antistatic behaviour, ATEX-approved PMA conduits shall be used exclusively in combination with special PMA connectors and accessories which are also ATEX-approved. These connectors and accessories (seals, fasteners) are also made of discharging material and are designated with the conformity marking.

The ATEX-approved connectors or accessories shall always be in direct contact with a metallic surface (ground). No insulating materials (e.g. adhesives) and no components which are not ATEX-approved shall be used between the discharging plastic parts or between plastic parts and metal surfaces.

## 使用场合

根据 94/9/EC(ATEX 95)附录 1 和 99/92/EC (ATEX 137) 指令, 产品可用于设备组别 II, 分类 2G, 1/2 区, 气体组别为 IIA, IIB, IIC 危险区域。安装使用时要求符合 EN60079-14 标准。

符合 94/9/EC(ATEX 95)附录 1 的指令, 99/92/EC (ATEX 137) 对于气体/粉尘混合的规定, 产品可用于设备组别 II, 分类 21/22 区。安装使用时要求符合 EN50018-14 标准。

## 使用, 服务, 维护

使用场合的工作温度范围: -20°C 至 +80°C (根据 EN60079-0, 或旧版本 EN50014 对于电气设备温度范围的规定)

需要对于电缆保护系统进行定期的外观检查, 时间间隔最长不超过 5 年。如果软管、接头和附件检查后有损伤(破洞, 裂缝, 超载现象) 情况出现, 需要替换损伤部分的产品。(如果出现明显的机械损伤, 需要确认使用是否有误)。

只能用 ATEX 认证防爆产品替换原来的 ATEX 认证的防爆产品。

以上工作和安装指示包含产品保养和维护的重要信息, 请务必遵守。

## 安装

通过 ATEX 认证的 PMA 软管必须和同样通过 ATEX 认证的管接头和附件配合, 以保证相应的抗静电积聚特性。这些附件也是由可释放静电荷的材料制成, 同样标有防爆产品的相关标记。

这些通过 ATEX 认证的接头和附件应与金属表面连接(接地连接)。导电性塑料部件之间, 或电性塑料部件和金属部件之间, 不可以安装非导电材料(如粘合剂)的部件。

Resistance against	防护	Chemical Formula 化学分子式	PA6	PA12	PP	TPU	PFA
			Polyamide 6 PA66 Polyamide 66	Polyamide 12	Polypropylene PE Polyethylene	Thermoplastic Polyurethane elastomer	Perfluoroalkoxy- copolymer PVDF Polyvinylidene fluoride
Acetic acid (10%)	醋酸 (10%)	C <sub>2</sub> H <sub>4</sub> O <sub>2</sub>	●	●●	●●●	○	●●●
Acetone	丙酮	C <sub>3</sub> H <sub>6</sub> O	●●●	●●●	●●●	○	●●●
Ammonia (30%)	氨水 (30%)	NH <sub>3</sub>	●●●	●●●	●●●	○	●●●
Benzine	汽油	-	●●●	●●●	●●	●	●●●
Brake fluid	制动液	-	●●●	●●●	●●●	○	●●●
Caustic soda	苛性钠	HNaO	●●●	●●●	●●●	●	●●●
Ethyl alcohol (40%)	乙醇 (40%)	C <sub>2</sub> H <sub>6</sub> O	●●●	●●●	●●●	●	●●●
Glycol	烯糖	C <sub>2</sub> H <sub>6</sub> O <sub>2</sub>	●●●	●●●	●●●	○	●●●
Hydrochloric acid (10%)	盐酸 (10%)	HCL	○	●	●●●	○	●●●
Methanol	甲醇	CH <sub>4</sub> O	●●	●●●	●●●	●	●●●
Methyl ethyl ketone	丁酮	C <sub>4</sub> H <sub>8</sub> O	●●●	●●●	●●●	○	●●●
Nitric acid (10%)	硝酸 (10%)	HNO <sub>3</sub>	○	○	●●	○	●●●
Paint thinner	涂料稀释剂	-	●●●	●●●	●	○	●●●
Perchlorethylene	全氯乙烯	C <sub>2</sub> Cl <sub>4</sub>	●●	●●	●●	○	●●●
Paraffin	石蜡	-	●●●	●●●	●	○	●●●
Phosphoric acid (10%)	磷酸 (10%)	H <sub>3</sub> O <sub>4</sub> P	●	●●	●●●	○	●●●
Sea water	海水	-	●●●	●●●	●●●	●●	●●●
Soap solution	肥皂水	-	●●●	●●●	●●●	●●	●●●
Sodium chloride	氯化钠	NaCl	●●●	●●●	●●●	●●●	●●●
Sulphuric acid (10%)	硫酸 (10%)	H <sub>2</sub> SO <sub>4</sub>	●	●●	●●●	○	●●●
Toluene	甲苯	C <sub>7</sub> H <sub>8</sub>	●●●	●●●	●	○	●●●
Trichlorethylene	三氯乙烯	C <sub>2</sub> HCl <sub>3</sub>	●	●●	○	○	●●●
Turpentine	松节油	-	●●●	●●●	○	○	●●●
Urine	稀释尿液	-	●●●	●●●	●●●	●●●	●●●
<b>Resistance against Oils and Fats</b>	<b>防护油 and 脂</b>	-					
Cutting oils*	切削液	-	●●●	●●●	●●	●	●●●
Diesel oil	柴油	-	●●●	●●●	●●	●●	●●●
ASTM Oil Nr.3	ASTM No.3 油	-	●●●	●●●	●●	●	●●●
Fuel oil	燃油	-	●●●	●●●	●●	●	●●●
Hydraulic oils*	液压油	-	●●●	●●●	●●	●	●●●
Mineral oils	矿物油	-	●●●	●●●	●●	●●●	●●●
Spark-erosion liquids	电火花腐蚀液	-	●●●	●●●	●●	●	●●●
Skydrol	特种液压工作油	-	●	●●	●●	○	●●●
Transformer oils*	变压器油	-	●●●	●●●	●●	●	●●●

\* Synthetic additives can affect the oil resistance of plastics.  
Please contact PMA for further information

- Excellent resistance / suitable for permanent contact
- Resistant / suitable for occasional contact
- Relatively resistant / suitable for short-term contact
- Not recommended

\* 合成添加剂会影响塑料的防油性能，请联系 PMA 咨询进一步信息。

- 良好的抵抗力/适用，永久接触。
- 有抵抗力/适用，非经常接触。
- 相当抵抗力/适用，短间接接触。
- 不推荐

**Important:**

The chemical resistance of plastic products is also dependant on factors such as temperature, amount of time exposed to chemicals (e.g. occasional contact or immersed) as well as the concentration of the specific chemicals.  
The stated chemical resistances are valid for a temperature of 20 °C. The chemical resistance table above serves only as a guide for the use of polyamide products in conjunction with the listed chemicals.  
Each specific application should be controlled for suitability by the end-user.  
A more detailed table can be found on the PMA Homepage under [www.pma.ch](http://www.pma.ch).

**注意:**

塑料产品的抗化学性能同样取决于其他因素，如：温度，暴露在化学物质中的时间（非经常接触或浸没等情况）、浓度等。  
上述抗化学性能在 20°C 温度环境下有效。  
上述抗化学性能表仅是对聚酰胺产品与所列化学物质的简要指南，为了正确使用，终端用户应能控制每个特殊运用。  
更多详细表格可查阅 PMA 网站 [www.pma.ch](http://www.pma.ch)。



## Important Information

The specifications and instructions for our customers in this document reflect the product engineering level at the time of manufacturing. PMA AG accepts no liability for damages resulting from unprofessional installation or application or misuse for a purpose. This disclaimer also includes damages to third parties. It is the customer's responsibility to check the delivered products and immediately notify PMA AG of detected faults. It is also the customer's responsibility to test the delivered product on its applicability for the intended purpose. PMA AG will accept no liability or responsibility for their products if a product or a PMA system is combined or used together with third-party products, i.e. products from other companies than PMA AG. Jurisdiction in all legal disputes concerning product liability have the courts of the canton of Zurich/Switzerland. Swiss law applies.

To guarantee punctual deliveries please check availability of products before ordering.

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For more information go to: [www.pma.ch](http://www.pma.ch)

## 重要信息

本档中对于客户的产品叙述说明、反映了制造时代的产品工艺水平。PMA 公司对于由于非专业的安装使用以及选型错误所造成的损害不承担责任。客户负责检查运输到来的产品，以及立即将检查出来的问题反馈给 PMA。客户也有责任对于应用的产品进行相关测试。对于 PMA 或系统与第三方产品结合时出现的各种情况，PMA 公司不承担责任。

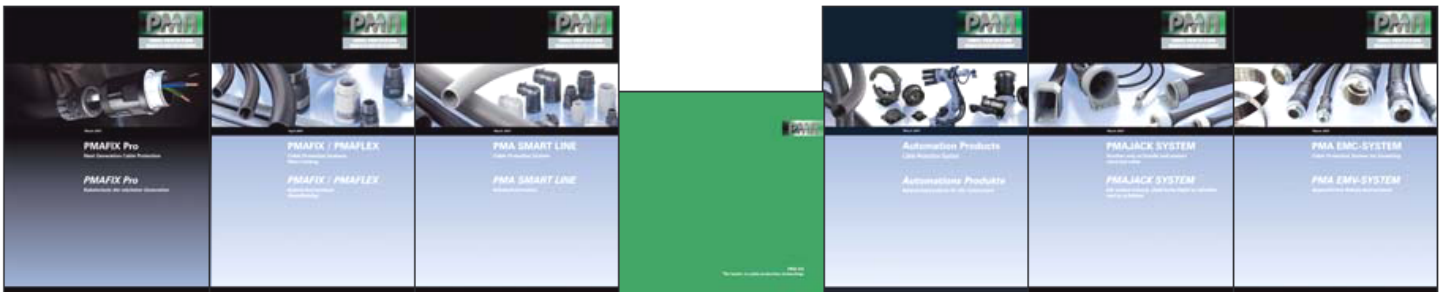
为保证准备的产品运输时间，请在订购之前检查产品库存量。

在本书中出现的文字、图案、表格以及照片，不被允许进行部分或全部的复印，更不能被第三方用于其它的方面。不管资料是否有用。在任何情况下，PMA 公司保留通过法律手段解决问题的权利。

更多信息请访问：[www.pma.ch](http://www.pma.ch)

## Overview of Catalogues

## 产品目录概览



### PMAFIX Pro

Next generation cable protection. IP69K for static and dynamic applications.

新一代电缆保护。IP69K 静态和动态应用。

### PMAFIX PMAFLEX

The PMA main catalogue with 6'000 excellent products.

PMA 主要产品目录含有 6000 种优良产品

### PMA SMART LINE

Functional and modern design with high quality at an excellent price.

PMA Smartline 产品设计新近，功能良好，性价比高。

### Company Profile

Overview of the structure and services of PMA.

PMA 公司结构及服务总览

### AUTOMATION PRODUCTS

Special products for Automation applications..

特殊系列自动化应用

### PMAJACK SYSTEM

Special series of braids and braid terminations.

特殊编织网管及编织网管端件。

### EMC/EMV SYSTEM

Special products for EMC screening.

特殊产品 EMC 屏蔽

# PMA

**CABLE PROTECTION**

电缆保护



**PMA-KAT.19 D/E**

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