



PMA – Orban Workshop 2023-12-08

Sales, PM



- 1. PMA – Company profile
- 2. PMA –Infrastructures product portfolio
- 3. PMA – TRUST – System
- 4. PMA – Product Highlights
- 5. PMA – Service



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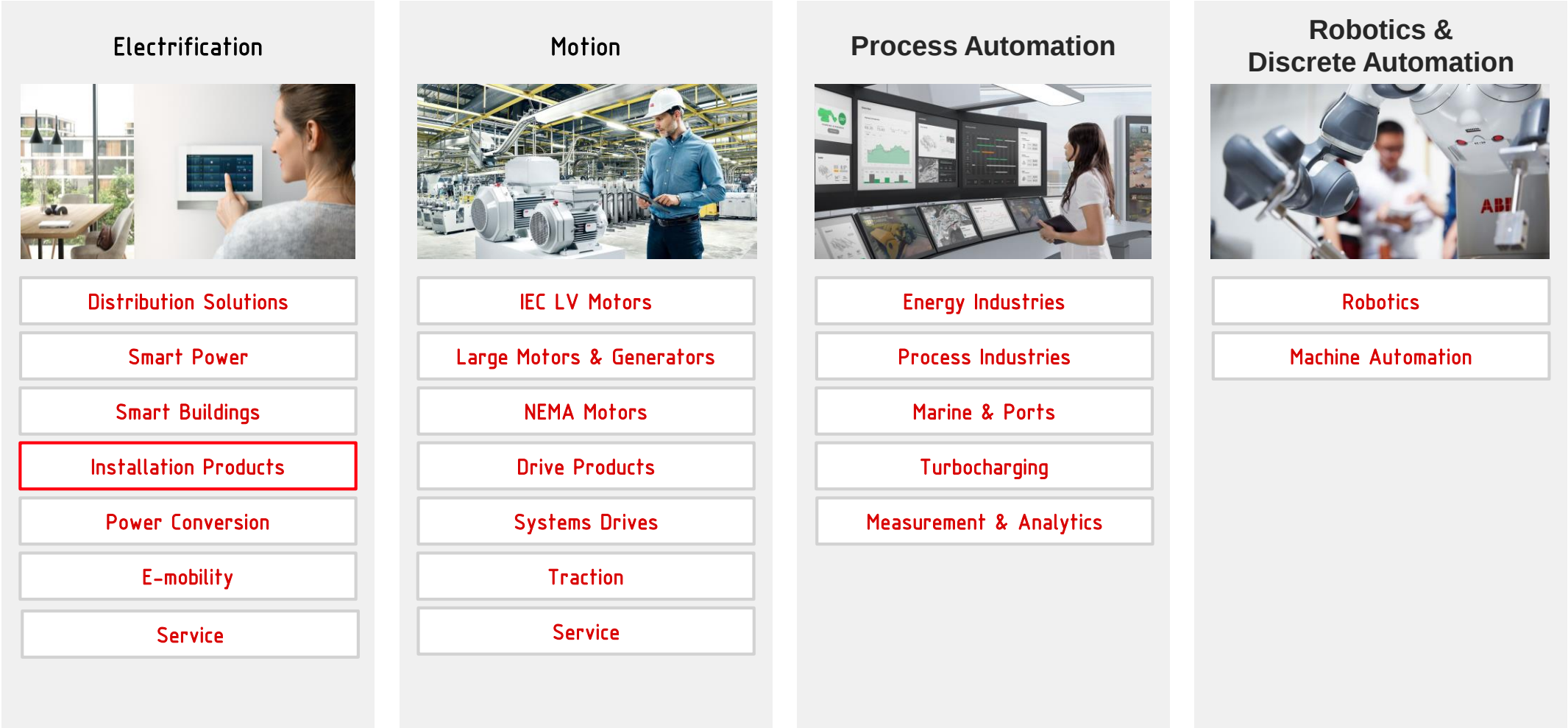
Company profile
PMA



Fully decentralized business model with 21 divisions

Business
areas

DIVISION





1975

Established in Wetzikon,
Switzerland

PMAFIX/FLEX system for
rail
1981



1982

PMAFIX system
established in Europe

ISO Certification
1991



1995

Moved Facility to Uster,
Switzerland

Introduction universal clip
IP66 / IP68
2000



Thomas & Betts



International Railway
Industry Certification
2010



Launch PMAFIX Pro
2007



Launch PMA Smartline
2001

2010

Thomas & Betts takes
over PMA



2009

Innovative Multilayer
conduits generation



2005

Launch PMA EX System in
hazardous areas



2012

ABB takes over
Thomas & Betts

Introduction of fire
barrier solutions
2014



2015

Overextrusion technology
for hygienic applications

Launch of XPCS and
XPCSF
2017



2021

Launch of
PMA TRUST

50 years PMA
2025



The image shows a modern, multi-story building with a light gray facade and large glass windows. The ABB logo is prominently displayed on the upper part of the building. The building is surrounded by a parking lot with several cars, including a white van with 'APLEONA' written on it. The sky is blue with some clouds.

ABB ABB

Employees

~145

Partners

~100

Countries

42

Products

~ 6500

Tools

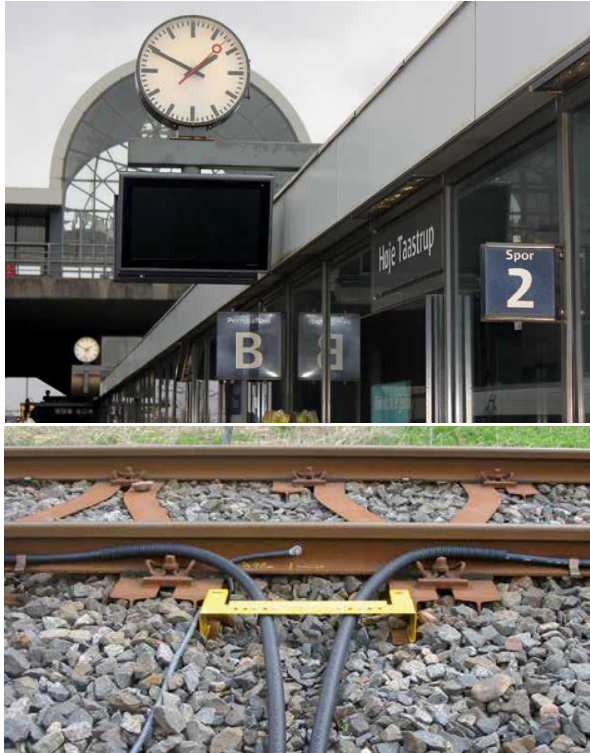
> 400

Railway

Rolling stock



Railway Infrastructure



PMA worldwide recognitions



2

PMA – Rail infrastructure product portfolio

Extract from major PMA products

Product overview



Monolayer Conduits



Multilayer Conduits



Overextruded Conduits



UL-Listed Conduits



Divisible Conduits



Smart Line Conduits



PMAFIX Pro Fittings



PMAFIX Fittings



Accessories



Robotics & Automation

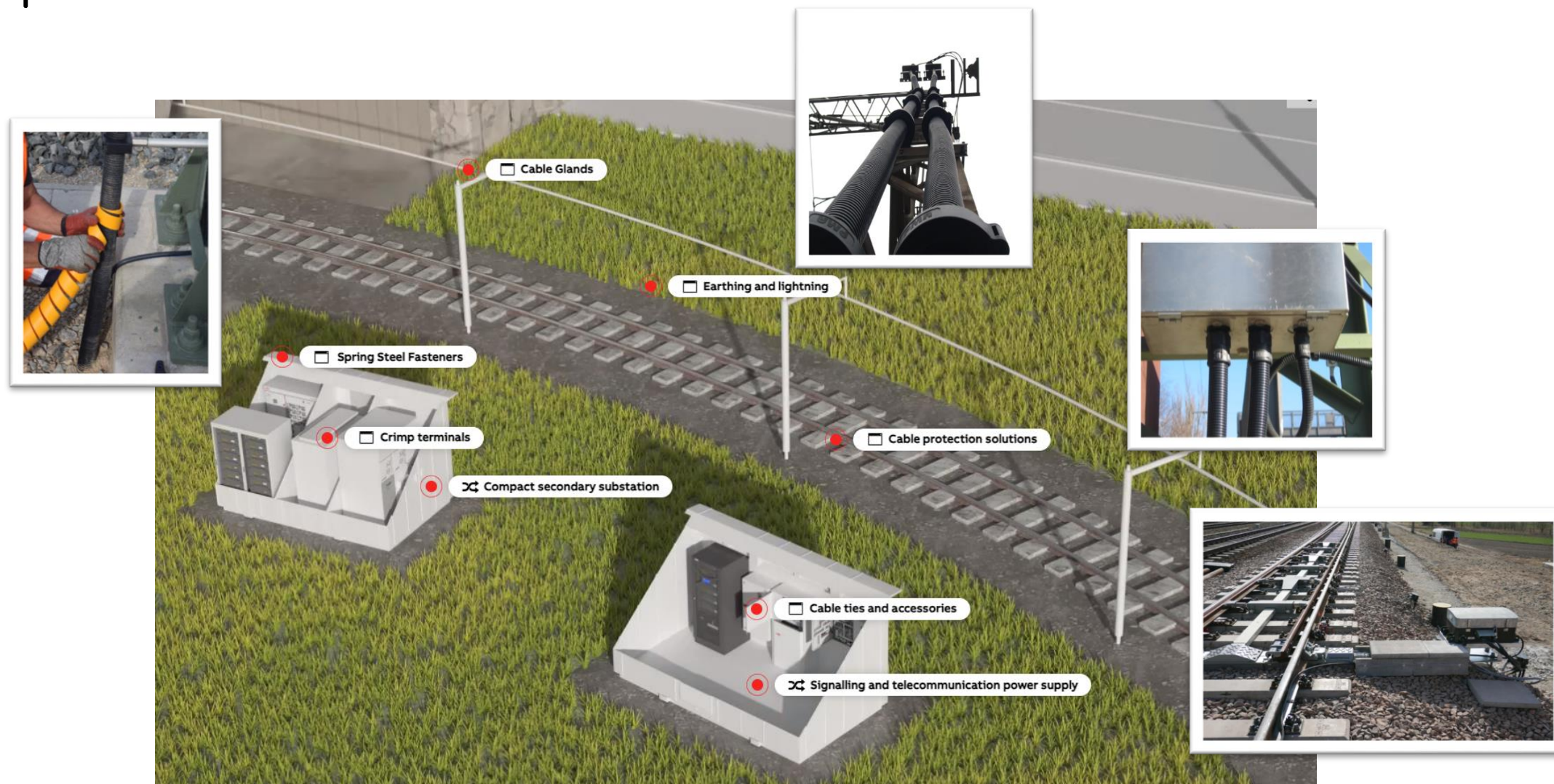


EMC Solutions



Plastic & metal braids

Cable protection rail infrastructure



Cable Protection for trackside applications worldwide

What does the railway operators want to achieve

- Extended service life of the cables due to additional protection against weather influences
- Increased mechanical protection against damage
- Protection against freezing of the cables in the track ballast
- Protection of cables against damage caused by vibrations
- A system with certified IP66/ IP67/ IP68/ IP69 degree of protection
- Approved and proven fire protection properties (specially for installations in tunnels)
- Simple and safe installation that can be repeated with the same protection class

Cable Protection for trackside applications

Existing solutions with rubber hose / PVC solid tube

Disadvantages

- Less compressive strength
- With small bending radius kinking of the hose
- Additional material (e.g. using talcum powder) and working time necessary for pulling the cables
- System tightness (depending on installer)
- Conditionally UV-resistance / weather resistance
- No certification of fire properties

Examples



Presentation PMA portfolio

PMA Cable Protection Systems

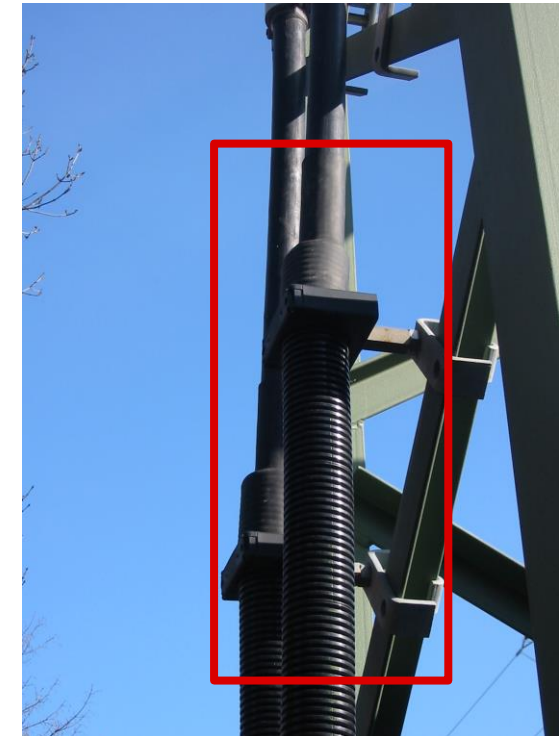
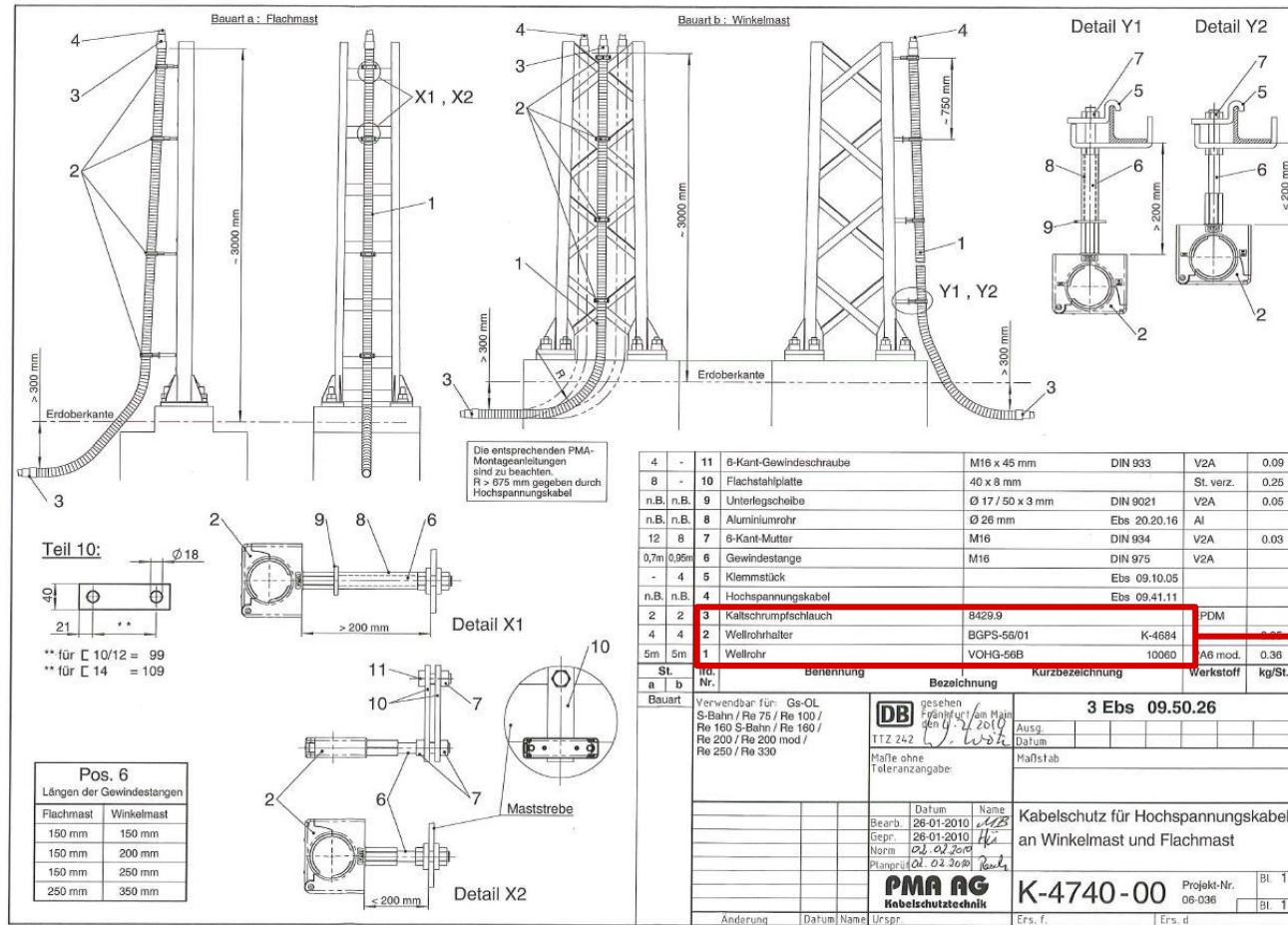
General product features

- Simple and safe installation
- Opening only with tool (simple screwdriver)
- Vibration-proof screw connections / joints
- High system pull-out strength
- Protection classes IP according to international standards
- Resistant to harsh environmental conditions(very low and very high application temperatures, weathering, resistant to very many chemicals)
- High mechanical strength
- Excellent long-term properties (25 years and more)
- Excellent fire protection properties (flammability, smoke emission- smoke emission, toxicity of smoke gases)
- REACH and RoHS requirements are fulfilled
- Easy cable pulling without any additional material



Application specific KIT's

Example: KIT-KHK/ 01 version for high-voltage feeding cable



Merged into KIT-KHK/01

Content:
VOHG-56B + BGPS-56/01 + KS8429.9

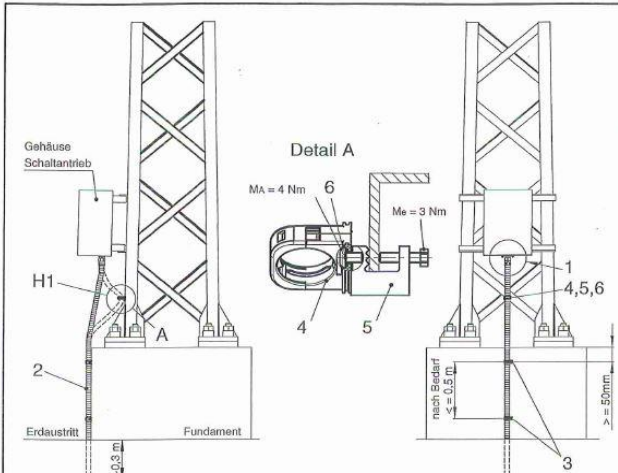
NEW



2 x BGG2-56 + 2 x BGG2-70/01 +
SPIRAL-PE-56XY + SPIRAL-PE-70B

Application specific KIT's

Example: Version VNDZ-NW29/01 for pole switch actuator



H1: Befestigung an schräger Maststrebe bei Bedarf, nur wenn Abstand Schaltantrieb - Wellrohrhalter am Fundament >0,5m!

lfd. Nr. 4, 5, 6 als Set bestellbar : KIT-FH-NW29/01

n.B.	6	Linse	Schraube mit Kreuzschlitz	Linse-Schr M8x10	DIN7985	St. vz.	0,01
n.B. <td>5<th>Schraubklammer</th><td>FH-107</td><td></td><td>40600</td><th>St. vz.</th><td>0,04</td></td>	5 <th>Schraubklammer</th> <td>FH-107</td> <td></td> <td>40600</td> <th>St. vz.</th> <td>0,04</td>	Schraubklammer	FH-107		40600	St. vz.	0,04
n.B. <td>4<th>Wellrohrhalter</th><td>BFH-29-0</td><td></td><td>40001</td><th>PA6 mod.</th><td>0,01</td></td>	4 <th>Wellrohrhalter</th> <td>BFH-29-0</td> <td></td> <td>40001</td> <th>PA6 mod.</th> <td>0,01</td>	Wellrohrhalter	BFH-29-0		40001	PA6 mod.	0,01
n.B. <td>3<th>Wellrohrhalter</th><td>BGL-29</td><td></td><td>60024</td><th>PA6 mod.</th><td>0,01</td></td>	3 <th>Wellrohrhalter</th> <td>BGL-29</td> <td></td> <td>60024</td> <th>PA6 mod.</th> <td>0,01</td>	Wellrohrhalter	BGL-29		60024	PA6 mod.	0,01
n.B. <td>2<th>Wellrohr</th><td>VCSG-29B</td><td></td><td>10060</td><th>PA6 mod.</th><td>0,15</td></td>	2 <th>Wellrohr</th> <td>VCSG-29B</td> <td></td> <td>10060</td> <th>PA6 mod.</th> <td>0,15</td>	Wellrohr	VCSG-29B		10060	PA6 mod.	0,15
1		Anschlussset NW29	VNDZ-NW29/01		K-5002		0,75

St. lfd. Nr.	Benennung	Bezeichnung	Kurzbezeichnung	Werkstoff	kg/St.
1	Anschlussset NW29	VNDZ-NW29/01	K-5002		0,75

Verwendbar für:

Ge-OL / S-Bahn /
Re 75 / Re 100 /
Re 160 S-Bahn / Re 160 /
Re 200 / Re 200 mod /
Re 250 / Re 330

DB gesehen
Frankfurt am Main
den 02-07-2009
VTZ 242 gez. W. Krötz

Maße ohne
Toleranzangabe:

Maßstab

4 Ebs 09.31.19

Datum Name
Bearb. 05-06-2009 MB
Gepr. 05-06-2009 HÜ

Norm
Planprüf 21-06-2009 KGH

Kabelschutz für Zuleitung
Mastschalterantrieb

1 T. 6 ersetzt durch FH-107 18.04.11 242 16.7.11 242

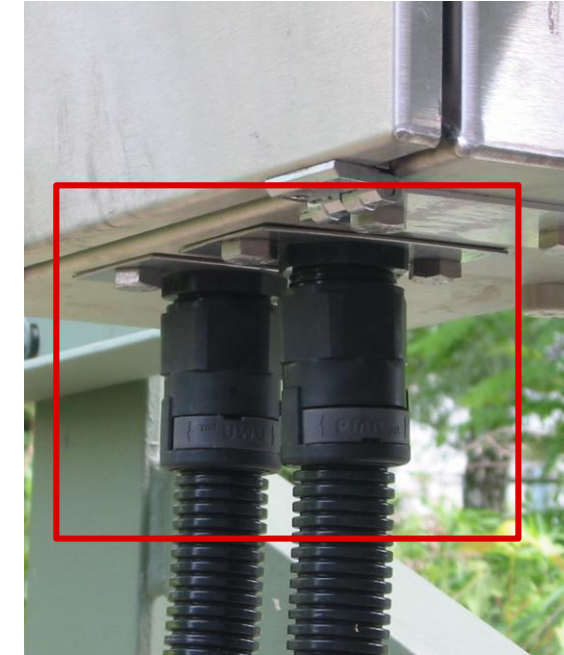
PMA AG
Kabelschutzeschutztechnik

K-4701-01

Nr. Änderung Datum Name Urspr. Ers. f. Ers. d

Bl. 1
Bl. 1

Vervielfältigung und Verwertung
nur für Zwecke der DB AG frei

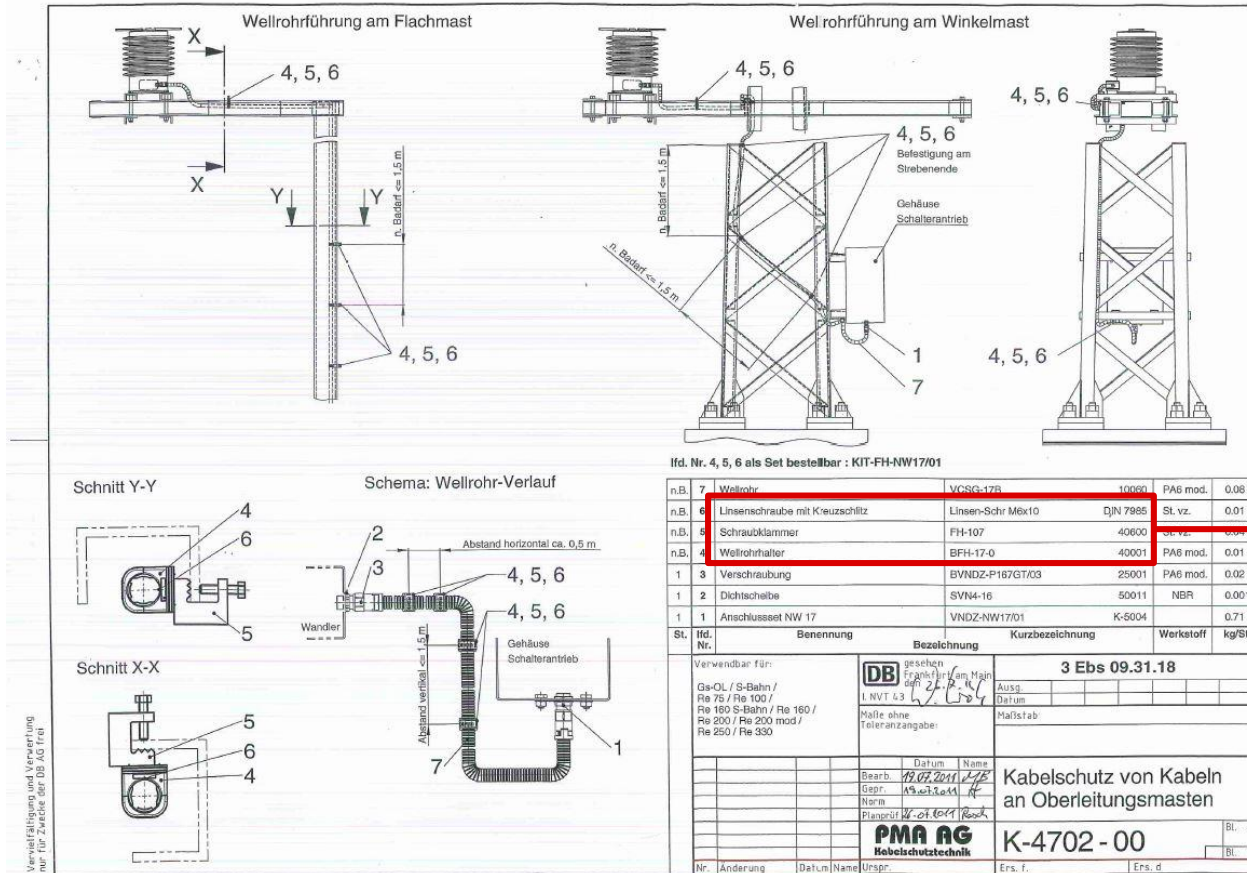


VNDZ-NW29/01
(installed 2x on the photo)

Content:
BVNDZ-M329 + BMN-M32 + SVN4-M32 + V2A plate

Application specific KIT's

Example: KIT-FH-NW17/01 version for fastening to overhead contact line poles



Merged into KIT-FH-NW17/01

Content:
BFH-17-0 + FH-107 + M6 Screw

PMA products for different applications

For static and dynamic external applications



Products: XSOL, XVCS1,

UV-resistance: +++

Weathering res.:	+++
Mechanical strength:	++
Impact resistance	
low temperatures:	++



Products: XSOL, XVCS1, Kit Spiral

UV-resistance: ++

Weathering res.:	+++
Mechanical strength:	++
Impact resistance	
ow temperatures:	++



Products: XSOL, XVCS1, PMAfix, PMAfix Pro

UV-resistance: ++

Weathering res.:	+++
Mechanical strength:	++
Impact resistance	
low temperatures:	++



Products: XSOL, VAM, PMAfix, PMAfix Pro

UV-resistance: ++

Weathering res.:	+++
Mechanical strength:	++
Impact resistance	
low temperatures:	++

PMA fittings offer

Our highlights:

- PMAFIX IP66, IP68 (IP69)
- PMAFIX Pro
- Divisible System



[PMA main catalogue](#)

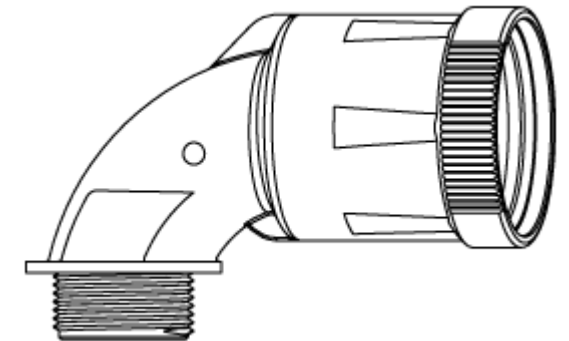
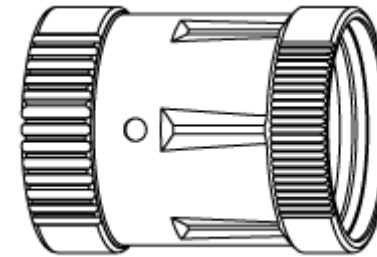
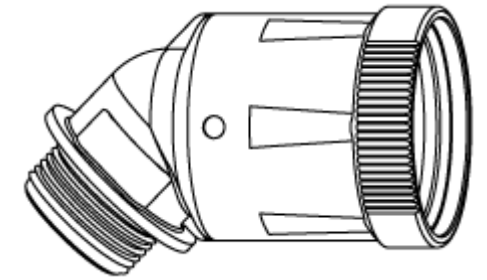
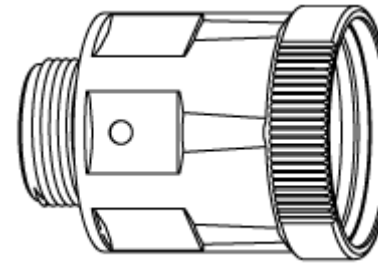
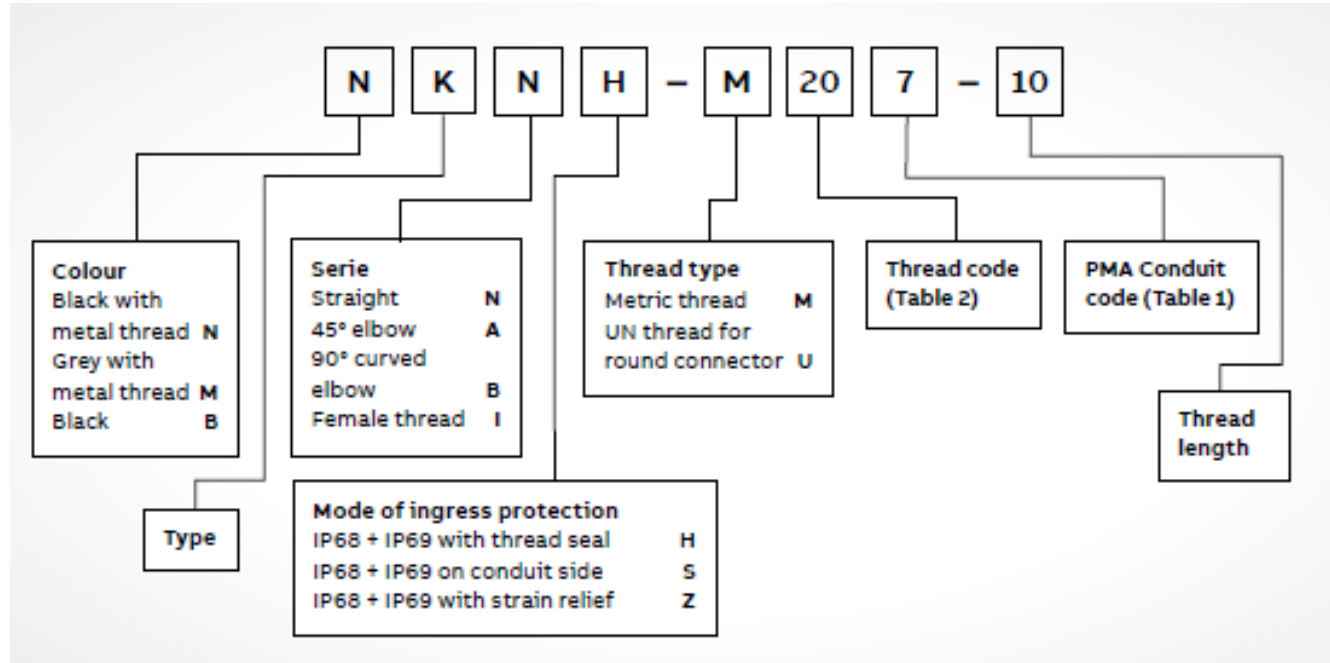
PMAFIX Pro IP68 (IP69)

- The new generation fittings are the product of experience gained over many years in the most varied application areas.
- The PMAFIX Pro has two components, an outer body and an inner sealing element.
- The sealing element functions both as a seal and as a locking mechanism providing all ingress protection grades up to IP68 and IP69 even in applications where there is long term continuous movement.



PMA Part Number Structure

PMAFIX Pro Fittings



PMAFIX

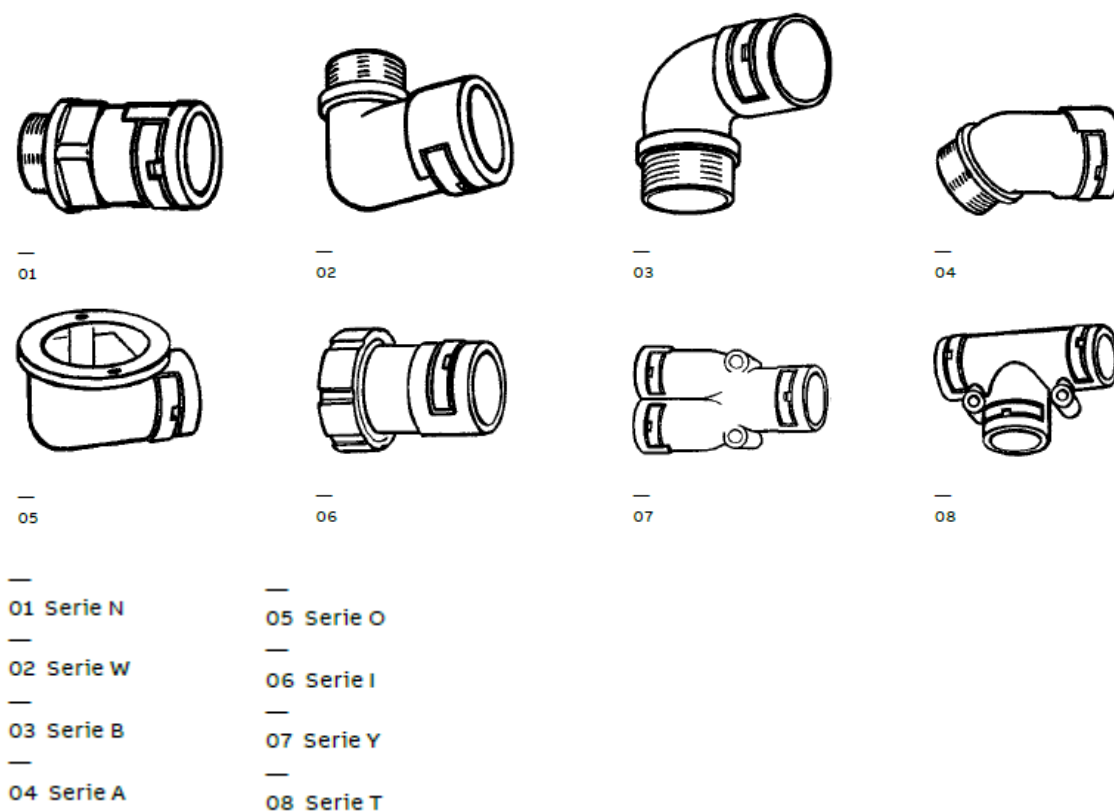
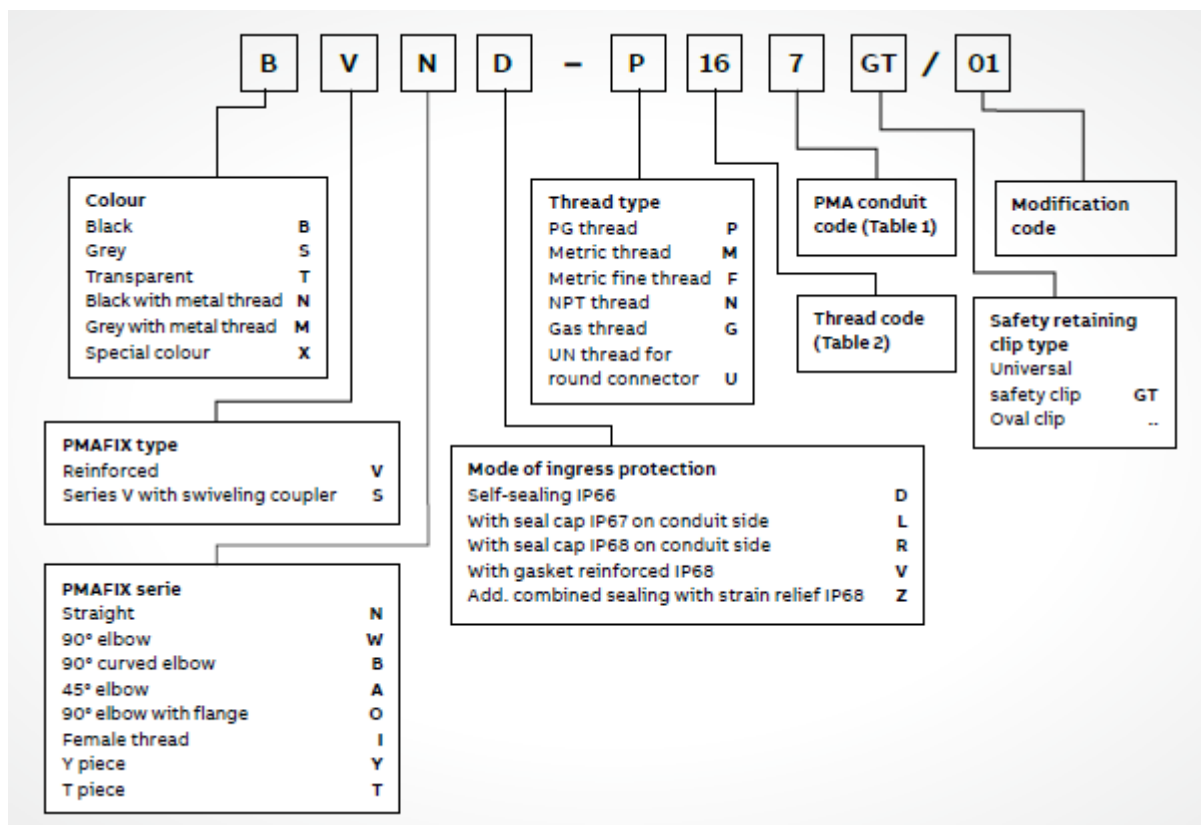
IP66, IP68 (IP69)

- Connectors are available for degrees of ingress protection IP66 and IP68
- IP66 - connectors are fitted with a pre-installed universal safety clip which ensures a quick “push-in” installation
- IP68 - connectors for increased requirements will be delivered with a special conduit seal cap.
- It is also possible to upgrade the fittings to IP69 by retrofitting water impact protection



PMA Part Number Structure

PMAFIX Fittings



Cable Protection for trackside applications

Cable distributor for point heaters



Rail foot cable branch with divisible corrugated tube



Axle counter



Cable Protection for trackside applications

Track magnet



Signal junction box



Cable Protection for trackside applications

Feeding overhead line also incl. KIT-SPIRAL-56BY



Pole Switch Actuator



Cable Protection for trackside applications

Spain (Signal junction box)



Hungary (Point heating)



Italy (Point control box)



Cable Protection for trackside applications

Poland (JVA trackside boxes with the Alstom SmartDrive (HyDrive) system in the R1200 Track Tec turnout – testing ground)



Poland (Point control box)





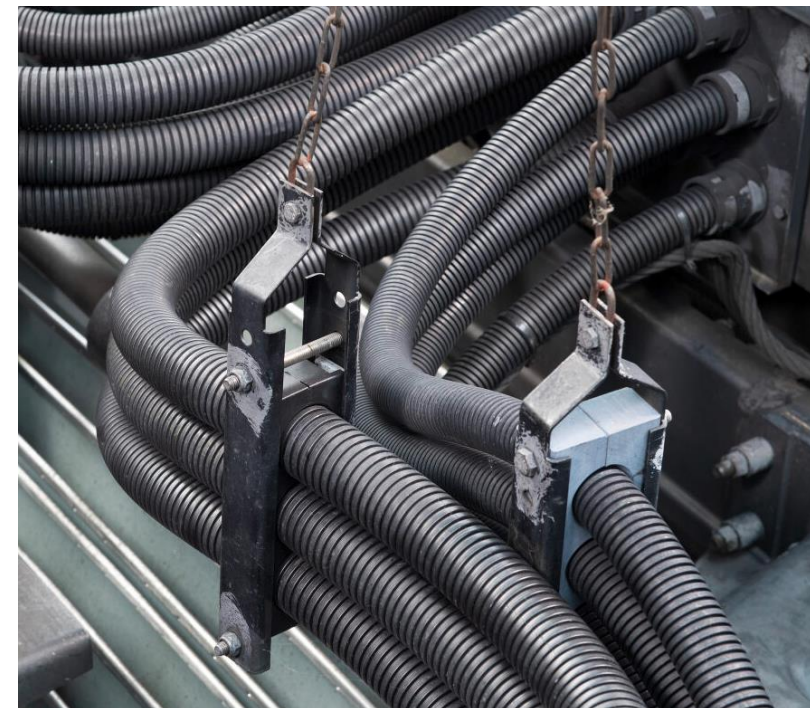
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PMA – TRUST
System

PMA TRUST™ Modular support system

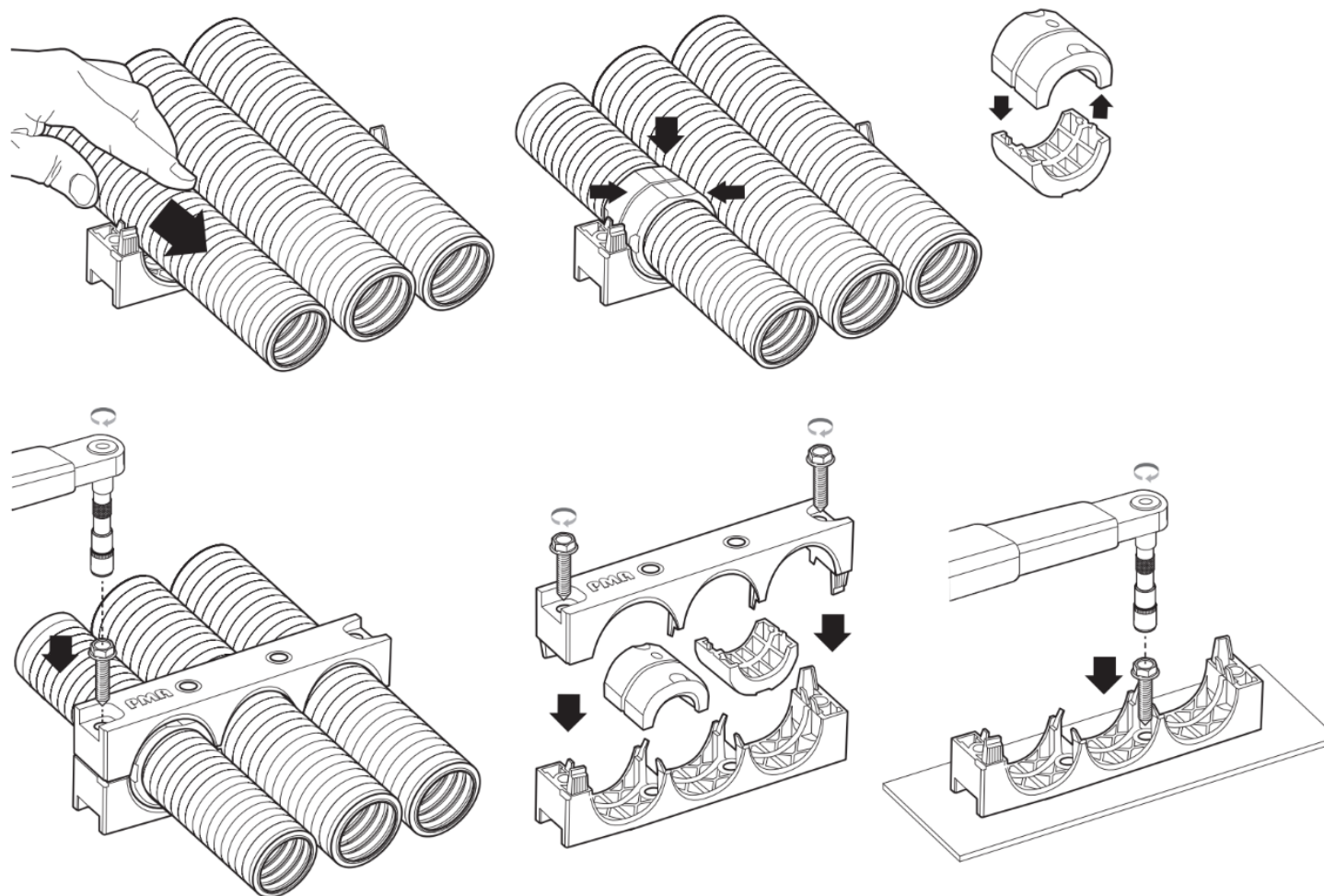
- PMA® TRUST™ modular support system is a lightweight, compact solution with high impact resistance
- Thanks to the new design, external dimensions are reduced to the very minimum and internal spacing between adjoining conduits is very small



PMA TRUST™ Modular support system



PMA TRUST™ Modular support system



4

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PMA – Product
Highlights

PMA Conduits



Conduits to protect your cables.

We offer many different conduit types for diverse applications with various technical requirements

The product groups

- PMAFLEX Pro
- PMAFLEX
- PMAFLEX PLus
- PMAFLEX Multilayer
- PMA Divisible System
- PMA Smart Line

PMA Multilayer System

PMAFLEX Pro

The next generation of corrugated conduit

- Conduits are based on advanced multilayer extrusion technology
- Conduit types with more than three layer combining the best characteristics of different materials
- Multilayer – technology can previously unattainable attributes.



PMAFLEX Pro Characteristics

- Highest resistance to UV and Weathering
- Highest Fire Safety
- Excellent Compression Strength
- Very High Impact resistance
- Excellent Low Temperature Characteristics
- Very Long Service Life

Multilayer Conduit type XPCS

For static and dynamic external applications

PA12/PA6 Multilayer conduit

- Excellent UV resistance, weathering and ageing characteristics.
- Good compression strength and impact resistance at low temperature and humidity
- Good flexibility and resistance to fatigue under continuous bending cycles
- Fire Safety Certification to EN 45545-2, HL2 and **NFPA 130**
- Temperature range: -50°C ... +95°C continuous, +150°C short-term
- Colour coding:
Outer layer: Black – Inner layer: Green
- Available in sizes from NW10 up to NW48



Multilayer Conduit type XPCSF

For highly dynamic external applications and where HL3 is mandatory

PA12/PA12 Multilayer conduit

- Highest flexibility and resistance to fatigue under continuous bending cycles
- Excellent UV resistance, weathering and ageing characteristics
- Very good compression strength and impact resistance at low temperature and humidity
- Fire Safety Certification to EN 45545-2, HL3
- Temperature range: -50°C ... +95°C continuous, +150°C short-term
- Colour coding:
Outer layer: Black – Inner layer: Orange
- Available in sizes from NW07 up to NW48



Multilayer Conduit type JXPCSF

For dynamic external applications with HL3 requirements

PA12/PA12 Multilayer XPCSF conduit over-extruded with a smooth PA12 outer layer

- Smooth outer layer **reduces significantly the adhesion and accumulation of ice** under extreme weather conditions
- Fire Safety Certification to EN 45545-2, **HL3**
- Excellent UV resistance, weathering and ageing characteristics.
- Very good compression strength and impact resistance at low temperature and humidity
- Temperature range: -50°C ... +95°C continuous, +150°C short-term
- Colour coding:
Outer layer: Black - Inner layer: Orange
- Available in sizes from NW07 up to NW48



Multilayer Conduit type XVCSF

For applications under carriages and on bogies

PA6/PA6 Multilayer conduit

- Very good compression strength and impact resistance at **low temperature and humidity**
- Excellent UV resistance, weathering and ageing characteristics.
- Fire Safety Certification to EN 45545-2, HL2
- Colour coding:
Outer layer: Black - Inner layer: Blue
- Temperature range: -50°C ... +105°C continuous, +160°C short-term
- Available in sizes from NW10 up to NW48



5

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PMA – Service

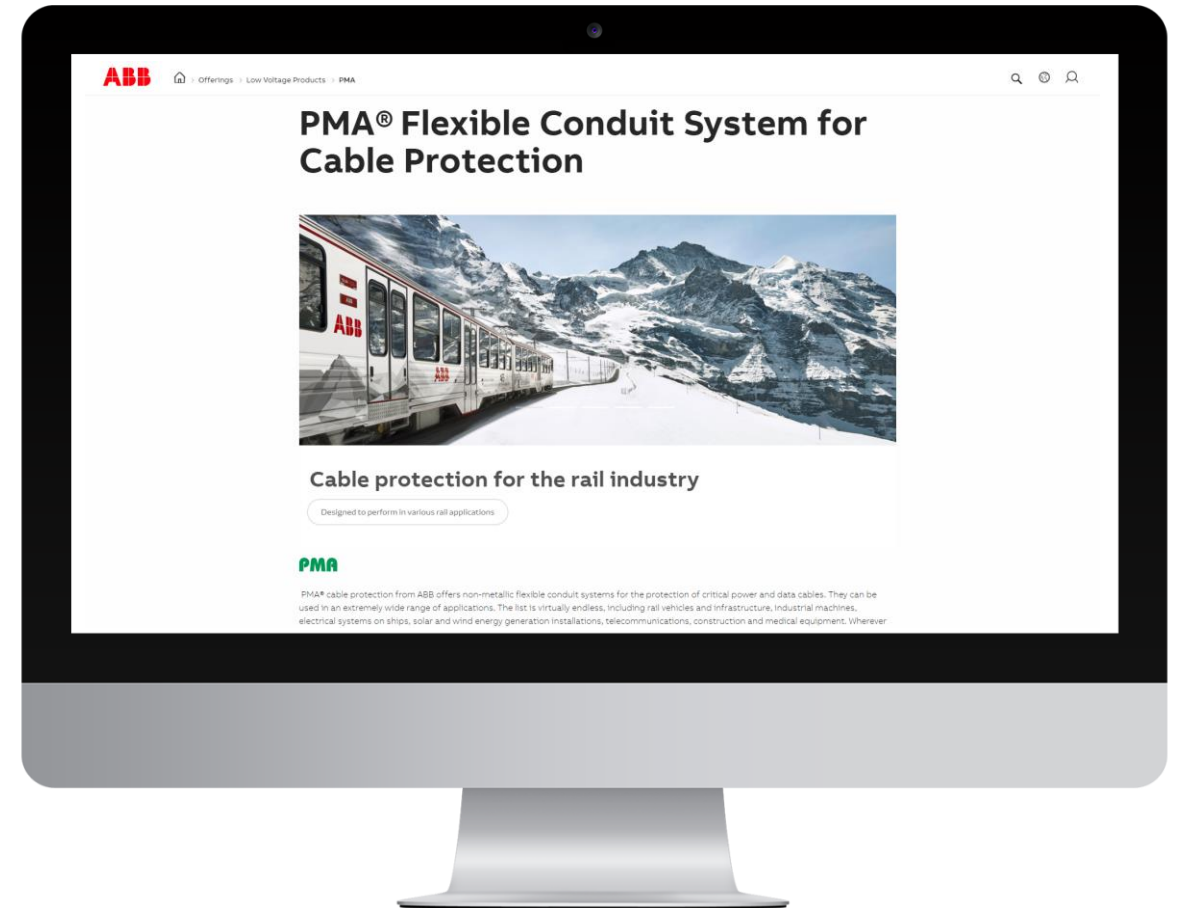
Where do you find more about us

Visit our website

Visit the PMA product web pages on pma.ch for our most up-to-date product lineup, and much more.

This is the place to go to find all of the planning documents you need at your fingertips, including:

- Technical data sheets
- General technical details
- CAD Files
- PMA videos (Product videos, assembly instructions, etc.)
- Product brochures
- PMA tests and certifications
- Contact addresses



Where do you find more about us

Visit our website

ABB

TECHNICAL DATA SHEET

PMAFLEX Multilayer - XTPC - Corrugated Conduit

Highly flexible, medium-duty

PMA



Highly flexible conduit for robotic applications with high resistance to abrasion and wear indication function. Especially suitable for narrow bending radii.

CE UK

Applications:

- For dynamic conduit systems in robotics and automation industry

Features & Benefits:

- With wear indication function
- High resistance to continuous bending
- No abrupt conduit failure due to high tear propagation resistance
- Very high abrasion resistance
- High resistance to tension
- Suitable for tight bending radii
- Long service life

Materials:

- Outer, intermediate and inner layer made from high-grade, specially modified Thermoplastic copolyester elastomer

Compatible with:

- PMA Automation Products
- Profi-Plus, Profi-Plus Fittings
- Profi-Plus Fittings
- PMA Accessories

Temperature range:

- 40°C ... +120°C continuous, +150°C short term

Weathering resistance:

- Good UV resistance and weathering characteristics

Colour:

- Outer layer: black (protection level: abrasion and UV resistant)
- Intermediate layer: yellow (warning sign)
- Inner layer: blue (inner limit reached: conduit should be replaced)

Chemical properties:

- Resistant to oil, grease, petrol, kerosene, diesel, engine oil, hydraulic oil, brake fluid, antifreeze, etc.

Environmental properties:

- Free from halogen and cadmium
- RoHS and REACH compliant

Item No.	Item Description	Unit	Weight (kg)
1	10m	10m	1.0
2	20m	20m	2.0
3	30m	30m	3.0
4	40m	40m	4.0
5	50m	50m	5.0
6	60m	60m	6.0
7	70m	70m	7.0
8	80m	80m	8.0
9	90m	90m	9.0
10	100m	100m	10.0

PMA

ABB



PMA® Cable Protection for the robotics and automation industry

ABB

Offerings > Low Voltage Products > PMA

XTPC Conduit

Three layer corrugated conduit, highly flexible, medium-duty (Multilayer)

Highly flexible conduit for robotic applications with high resistance to abrasion and wear indication function. Especially suitable for narrow bending radii.

Applications:

- For dynamically conduit systems in robotics and automation industry

Material & Characteristics:

- Outer, intermediate and inner layer made from high-grade, specially modified Thermoplastic copolyester elastomer
- With wear indication function
- High resistance to continuous bending
- No abrupt conduit failure during high tear propagation resistance
- Very high abrasion resistance
- High resistance to torsion
- Suitable for tight bending radii
- Long service life

Compatible with:

- PMA Automation Products
- PMA Pro, PMAFIX Fittings
- PMA Pro, PMAFIX Fittings
- PMA Pro, PMAFIX Fittings
- PMA Accessories

Technical Data Sheet XTPC

Brochure Automation Products

CAD files

PMA

ABB

1. PMAFLEX Pro

2. PMAFLEX

3. PMAFLEX

4. PMAFLEX

5. PMAFLEX

6. PMAFLEX

7. PMAFLEX

8. PMAFLEX

9. PMAFLEX

10. PMAFLEX

Select a country to see the local offices



Q & A

PMA

by ABB