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MAIN CATALOGUE

# PMA<sup>®</sup> Flexible cable protection systems

For applications with high requirements

**PMA**



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**PMA® cable protection products from ABB can be used in an extremely wide range of applications. The list is virtually endless, including rail vehicles and infrastructure, industrial machines, electrical systems on ships, solar and wind energy generation installations, telecommunications, construction and medical equipment. Wherever cables are installed and exposed to mechanical stresses and environmental hazards. Today and tomorrow we guarantee best quality regarding products, technical support, service and delivery.**

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# Introduction

## A swiss manufacturer with a global presence

There is no better reference than satisfied customers. PMA® cable protection provides customized specific solutions for customers worldwide.

ABB's PMA manufacturing site is located in Uster (Switzerland), close to Zurich. The majority of what we produce for the world market is made at this location. Also our research and development department is located here.

Thanks of our large network of professional partners in all of the major industrialised countries around the globe, we are able to guarantee best quality regarding products, technical support, service and fast delivery.

ABB is focused on providing solutions that address the critical issues in every area of operations, allowing customers to focus on plant sustainability, cost, quality, flexibility, safety and regulatory challenges.





#### Setting new standards and trends

Customer needs are a top priority at ABB, and we work every day to ensure all our customer requirements are met in our products. We offer cable protection solutions and services that are tailored to meet requirements in every type of application. Our range extends from basic items right up to the most demanding high-tech products. We can develop system solutions and special products that are designed to meet specific customer requirements. Our intensive research and development activities, which include the field of new materials, are a major reason why PMA products from ABB continue to set new standards and trends in the cable protection marketplace. These efforts together with excellent quality and service have helped us build up an outstanding reputation with leading corporations around the world.

#### From pioneer to market leader

ABB has been developing, producing, and selling top-quality PMA cable protection systems since 1975. Our high-quality Swiss products have rapidly earned us an excellent reputation worldwide and established us as the market leader. Our range of more than 6,500 products gives customers the protection they need in railway, mechanical engineering, and shipbuilding applications worldwide. PMA products are also the solution of choice in automation, building installations and other projects where power and data cables require dependable protection.

#### Unique benefits of PMA products from ABB

Service to the customer is what motivates us. In addition to series production, PMA can build fittings and conduits to meet individual requirements as a special service to our customers.

- A safe, reliable system that is easy to install
- Vibration-proof connections
- System connection strength
- Ingress protection conforming to recognized test methods
- High impact strength even at low temperatures
- High compression strength (peak load)
- Long-term reversed-bending resistance
- Good chemical resistance
- Fire protection (flammability and smoke generation)
- Good weather resistance
- Long wearing
- ...and much more

## Introduction

### Areas of applications



#### Mechanical engineering

A considerable number of PMA cable protection systems are used in mechanical engineering. A few examples illustrate how varied the range of mechanical engineering applications are; you will find our products in machine tools, packaging machines, printing machines, as well as heating, ventilation, conveyor, and filling systems. PMA products also make a vital contribution to the smooth operation of high voltage and emergency power systems, can production machinery and woodworking machines, etc. PMA cable protection solutions safeguard cables, wires and data links against heat, cold, tensile stress, pressure stress, and other external influences in the important mechanical engineering industry.

#### Rail vehicles/Rail infrastructure

PMA products from ABB have proven their dependability in railway construction projects around the world. This is the reason why large corporations including Siemens, Alstom, Bombardier, PESA, CSR/CNR, Deutsche Bahn, and SNCF have chosen us as supplier over a period of many years. Our special railway engineering product line provides protection and safety on signalling systems, couplings, trucks, and gangways, as well as roof, and underfloor equipment.

The range of applications is very extensive. PMA products contribute to the safe operation of trams, locomotives, freight cars, high-speed trains, and even roller coasters.

#### Worldwide recognitions

All PMA products are rigorously tried and tested to meet the demands of industry worldwide.





### **Automation/Robotics**

In the field of automation, there is a need for products that can withstand the stress of motion-intensive applications. Solutions developed by ABB for the automation industry fully meet these requirements. Special conduit designs, supports and abrasion protection sleeves provide optimal protection along the entire length of all moving elements, enabling engineers to achieve a massive reduction in torsional forces. There is good reason why leading robotics manufacturers rely on ABB technology.



### **Countless applications**

PMA cable protection products from ABB can be used in an extremely wide range of applications. The list is virtually endless and includes industries such as telecommunications, construction equipment and medical equipment. Wherever there is a need for cable protection, the PMA product portfolio provides safe, dependable, forward-looking solutions or will develop them specially for you to meet your individual needs.













# PMA® conduits

## Conduit guide

### PMAFLEX / PMAFLEX Multilayer / PMA Overextruded

<b>Construction:</b>	Monolayer	Blank
	Multilayer	X...
	Over extruded	J...
	Over ext. & ML	JX...

### Application areas

 <b>Traction vehicles</b>	Outdoor applications with sunlight exposure	static
		dynamic
	Outdoor applications	static
		dynamic
 <b>Rail infrastructure</b>	Outdoor applications with sunlight exposure	static
	Indoor and tunnel applications	static
 <b>Automation/Robotics</b>	Moving systems	dynamic
	Systems with extreme movements	dynamic
	Moving systems with antistatic requirements	dynamic
 <b>Machine building</b>	General applications	static
		dynamic
	Heavy loads	static
		dynamic
	Outdoor applications	static
	Antistatic requirements	static
 <b>Ship + Off-shore</b>	Outdoor general applications	static
		dynamic
	Indoor applications	static
		dynamic
 <b>Energy</b>	Outdoor applications with	static
	Indoor applications	static
 <b>Food &amp; Beverage</b>	General applications	static
		dynamic
<b>Others</b>  Vehicle building  Telecommunications  Building constructions  + High temperature applications  Ex hazardous areas (ATEX, IECEx)	static	
	indoor	
	indoor	
	indoor	
	static	
	static	

### Railway/Infrastructure

XPCS XPCS-OG XPCSL XPCSF XVCSF VAM VAML PLR XVCS2H XVCS1H

### Robotics/Automation

XR90 XTPC

●	●	●	●								
●	●	●	●								
●	●	●	●	●	●	●	●				
●	●	●	●								
●	●	●	●		●	●	●				
								●	●		
										●	●





# PMA® conduits
























## Conduit guide

### PMAFLEX / PMAFLEX Multilayer / PMA Overextruded




<b>Construction:</b>	Monolayer	Blank
	Multilayer	X...
	Over extruded	J...
	Over ext. & ML	JX...

### Properties / Approvals

<b>Material properties</b>	Ductility
	Reversed bending resistance
	Compression resistance
	Low temperature performance
	High temperature performance
	Resistance to weathering

<b>Approvals</b>	 EN 45545-2	
	 NFPA 130 (ASTM E162 – ASTM E662)	
	 BSS 7239/SMP 800-C ASTM E1354	
	 BS 6853 1a (interior)	
	 GOST 12.1.044-89	
	 Bi-National Recognition File UL1696 & CSA C22.2 No. 227.3-05	
	 CSA C22.2 No. 227.3-05	
	 Bi-National Listing File UL1660 & CSA C22.2 No. 227.2.1	
	 Free from halogens, REACH + RoHS compliant	
	 Non flame propagating EN61386	
 DNV (Type approved)		
 Lloyd's Register (Type approved)		
 Bureau Veritas (Type approved)		

<b>Hazardous</b>	 ATEX	
	 IECEX	

<b>Food &amp; Beverage</b>	 NSF	
	 Ecolab	

<b>Temperature range</b>	Continuous operating temperature (acc. to DO 9.21-4510)	Min. (-)	-40	-40	-50	-50	-50	-40	-40	-40	-50	-50	-40	-40
		Max. (+)	95	95	95	95	105	105	105	105	90	90	95	105
	Short term max. operating temperature Max. 168h (acc. to DO 9.21-4360)	(+)	150	150	150	150	160	160	160	160	120	120	150	150

<b>Sizes</b>	Nominal width	Min.	10	10	12	12	10	10	10	07	10	10	17	17
		Max.	48	48	48	48	48	48	125	48	48	48	48	70

	Railway/Infrastructure										Robotics/Automation	
	XPCS	XPCS-OG	XPCSL	XPCSF	XVCSF	VAM	VAML	PLR	XVCS2H	XVCS1H	XR90	XTPC
Ductility	█	█	█	█	█	█	█	█	█	█	█	█
Reversed bending resistance	█	█	█	█	█	█	█	█	█	█	█	█
Compression resistance	█	█	█	█	█	█	█	█	█	█	█	█
Low temperature performance	█	█	█	█	█	█	█	█	█	█	█	█
High temperature performance	█	█	█	█	█	█	█	█	█	█	█	█
Resistance to weathering	█	█	█	█	█	█	█	█	█	█	█	█
EN 45545-2	●	●	●	●	●	●	●	●	●	●		
NFPA 130	●	●	●			●	●					
BSS 7239	●	●	●			●	●					
BS 6853 1a												
GOST 12.1.044-89						●	●					
UL/CSA C22.2 No. 227.3-05												
UL/CSA C22.2 No. 227.2.1												
Free from halogens	●	●	●	●	●	●	●	●	●	●	●	●
EN61386	●	●	●	●	●	●	●	●				
DNV	●			●		●	●	●				
Lloyd's Register	●			●		●	●	●				
Bureau Veritas												
ATEX												
IECEX												
NSF												
Ecolab												
Min. (-)	-40	-40	-50	-50	-50	-40	-40	-40	-50	-50	-40	-40
Max. (+)	95	95	95	95	105	105	105	105	90	90	95	105
Short term max. operating temperature	150	150	150	150	160	160	160	160	120	120	150	150
Min.	10	10	12	12	10	10	10	07	10	10	17	17
Max.	48	48	48	48	48	48	125	48	48	48	48	70



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# PMA® conduits

## Overview

Conduits to protect 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 overbraided
- PMA overextruded

Many conduits are specially approved, e.g. CSA, UL Recognition, DNV, Lloyds, Bureau Veritas etc. All conduits are REACH and RoHS compliant.

Conduit sizes range from 6mm to 125mm Ø, from lightweight to heavyweight, and from pliable to highly flexible. PMA also offers slit and divisible conduits. Standard colours are black and grey.



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PMA® CONDUITS

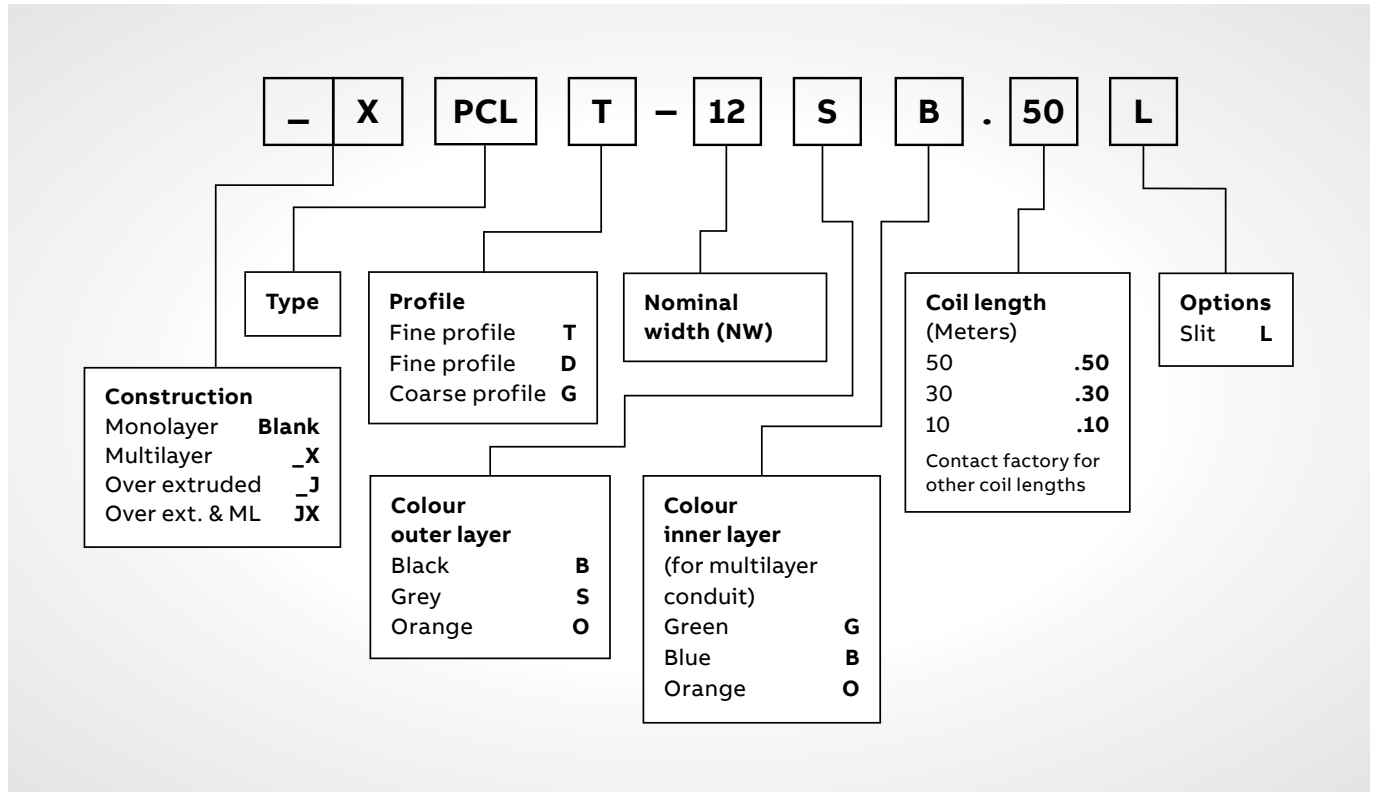
PMA offers a large range of very different mono- and multilayer conduit types which fulfill high technical demands to protect humans and cables.



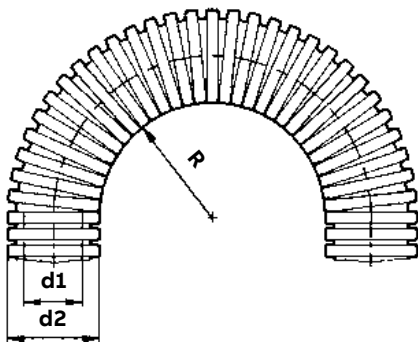
## PMA conduits

### Part number codes

For part number explanation only, not to be used as a configuration tool.



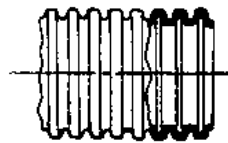
#### Radius



**Stat. radius** = Lowest recommended bending radius for static (fixed) installation.

**Dyn. radius** = Lowest recommended bending radius for dynamic (flexible) installation.

#### Profile



**Fine profile T**  
Tight bending radius.



**Coarse profile G**  
High pull-out strength.

## PMA conduit for Rail/Infrastructure

### Type XPCS conduit



Type XPCS / PMAFLEX Multilayer - Very flexible, medium-duty

	Order no. (black/green)	Conduit size NW	Inside Ø (mm)	Outside Ø (mm)	Stat./Dyn. radius (mm)	PU (m)
	XPCST-07BG.100	7	6.9	10.0	15/40	100
	XPCST-10BG.50	10	9.8	12.8	20/50	50
	XPCST-12BG.50	12	12.1	15.6	25/65	50
	XPCST-17BG.50	17	16.5	21.1	35/85	50
	XPCSG-17BG.50	17	15.8	21.1	35/85	50
	XPCSG-23BG.50	23	21.9	28.4	45/110	50
	XPCSG-29BG.50	29	27.7	34.5	55/135	50
	XPCSG-36BG.30	36	36.6	42.4	65/170	30
	XPCSG-48BG.30	48	47.5	54.5	85/220	30

Static and dynamic external applications on railway vehicles. On the roof: PA12 outer layer has excellent UV resistance characteristics  
 On inter-carriage connections: Excellent resistance to fatigue when exposed to continuous bending  
 On bogies and undercarriage: Excellent resistance to impact at low temperatures  
 Excellent mechanical characteristics, also under extreme climatic conditions (low temperature and low humidity)  
 Very Good flexibility. Self-extinguishing. High fire safety specification

#### XPCSL Index

min.	max.	Materials	Temperature range	Colour
Ductility		High-grade, specially formulated PA12/PA6	-50°C to +95°C	Black/Green
Fatigue reversed bending			Short-term to: +150°C	
Compression resistance		Free from halogens, REACH compliant and RoHS compliant	Self-extinguishing	UV Resistance
Low temperature performance				Very high (black)
Weathering resistance				

## PMA conduit for Rail/Infrastructure

### Type XPCS/OG & XPCSL conduit



Type XPCS/OG / PMAFLEX Multilayer - Very flexible, heavy-duty

	Order no. (orange/green)	Conduit size NW	Inside Ø (mm)	Outside Ø (mm)	Stat./Dyn. radius (mm)	PU (m)
	XPCST-07OG.100	7	6.9	10.0	15/40	100
	XPCST-10OG.50	10	9.8	12.8	20/50	50
	XPCST-12OG.50	12	12.1	15.6	25/65	50
	XPCST-17OG.50	17	16.5	21.1	35/85	50
	XPCSG-17OG.50	17	15.8	21.1	35/85	50
	XPCSG-23OG.50	23	21.9	28.4	45/110	50
	XPCSG-29OG.50	29	27.7	34.5	55/135	50
	XPCSG-36OG.30	36	36.6	42.4	65/170	30
	XPCSG-48OG.30	48	47.5	54.5	85/220	30

Static and dynamic external applications  
 Excellent mechanical characteristics, also under extreme climatic conditions (low temperature and low humidity)  
 Very Good flexibility / Self-extinguishing  
 High fire safety specification

#### XPCS/OG Index

min.	max.
Ductility	
Fatigue reversed bending	
Compression resistance	
Low temperature performance	
Weathering resistance	

Materials	Temperature range	Colour
High-grade, specially formulated PA12/PA6	-50°C to +95°C	Orange/Green
Certification	Fire performance	UV Resistance
Free from halogens, REACH compliant and RoHS compliant	Short-term to: +150°C Self-extinguishing	High (orange)

Type XPCSL / PMAFLEX Multilayer - Very flexible, medium-duty



	Order no. (black/green)	Conduit size NW	Inside Ø (mm)	Outside Ø (mm)	Stat./Dyn. radius (mm)	PU (m)
	XPCSLT-07BG.100	7	7.0	10.0	15/35	100
	XPCSLT-10BG.50	10	9.9	12.8	20/45	50
	XPCSLT-12BG.50	12	12.3	15.6	25/55	50
	XPCSLT-17BG.50	17	16.7	21.1	30/75	50
	XPCSLT-29BG.50	29	28.8	34.5	50/120	50
	XPCSLG-17BG.50	17	15.8	21.1	35/75	50
	XPCSLG-23BG.50	23	22.1	28.4	45/100	50
	XPCSLG-29BG.50	29	27.9	34.5	55/120	50
	XPCSLG-36BG.30	36	36.8	42.4	65/150	30
	XPCSLG-48BG.30	48	47.7	54.5	85/190	30

Static and dynamic external applications on railway vehicles  
 On the roof: PA12 outer layer has excellent UV resistance characteristics  
 On inter-carriage connections: Excellent resistance to fatigue when exposed to continuous bending  
 On bogies and undercarriage: Excellent resistance to impact at low temperatures  
 Excellent mechanical characteristics, also under extreme climatic conditions (low temperature and low humidity)  
 Very Good flexibility  
 Self-extinguishing  
 High fire safety specification

#### XPCSL Index

min.	max.
Ductility	
Fatigue reversed bending	
Compression resistance	
Low temperature performance	
Weathering resistance	

Materials	Temperature range	Colour
High-grade, specially formulated PA12/PA6	-50°C to +95°C	Black/Green
Certification	Fire performance	UV Resistance
Free from halogens, REACH compliant and RoHS compliant	Short-term to: +150°C Self-extinguishing	Very high (black)



# PMA conduit for Rail/Infrastructure

## Type XPCSF conduit



Type XPCSF / PMAFLEX Multilayer - Very flexible, heavy-duty

	Order no. (black/orange)	Conduit size NW	Inside Ø (mm)	Outside Ø (mm)	Stat./Dyn. radius (mm)	PU (m)
	XPCSFT-07BO.100	07	6.5	10.0	15/40	100
	XPCSFT-10BO.50	10	9.6	12.8	20/50	50
	XPCSFT-12BO.50	12	11.8	15.6	25/65	50
	XPCSFG-17BO.50	17	15.5	21.1	35/85	50
	XPCSFG-23BO.50	23	21.5	28.4	45/110	50
	XPCSFG-29BO.50	29	27.4	34.5	55/135	50
	XPCSFG-36BO.30	36	36.0	42.4	65/170	30
	XPCSFG-48BO.30	48	47.1	54.5	85/220	30

For dynamic outside applications in railway vehicles  
 For outdoor applications with highest requirements to UV and weathering resistance  
 Extensive railway approvals  
 Excellent flexibility  
 Very good mechanical characteristics even under extreme conditions, such as low temperatures and low humidity  
 HL3 acc. to EN 45545-2

### XPCSF Index

min.	max.
Ductility	
Fatigue reversed bending	
Compression resistance	
Low temperature performance	
Weathering resistance	


Materials	Temperature range	Colour
Outer layer: Specially formulated polyamide 12	-40°C to +95°C	Black/Orange
Inner layer: Specially formulated polyamide 12	Short-term to: +150°C	
Certification	Fire performance	UV Resistance
Free from halogens, REACH compliant and RoHS compliant	Self-extinguishing	Very high (black)

## PMA conduit for Rail/Infrastructure

### Type XVCSF conduit



Type XVCSF / PMAFLEX Multilayer - Flexible, heavy-duty

	Order no. (black/blue)	Conduit size NW	Inside Ø (mm)	Outside Ø (mm)	Stat. radius (mm)	PU (m)
	XVCSFT-07BB.50	7	6.7	10.0	15	50
	XVCSFT-10BB.50	10	9.6	12.8	20	50
	XVCSFT-12BB.50	12	11.9	15.6	25	50
	XVCSFG-17BB.50	17	15.6	21.1	40	50
	XVCSFG-23BB.50	23	21.5	28.4	50	50
	XVCSFG-29BB.50	29	27.7	34.5	60	50
	XVCSFG-36BB.30	36	35.9	42.4	75	30
	XVCSFG-48BB.30	48	46.8	54.5	90	30

Multilayer conduit for external rail applications  
 Rail static external applications such as under carriage, bogie, etc.  
 High compression and impact strengths at low temperature and low humidity  
 Good flexibility and very good UV resistance and weathering characteristics  
 Compatible with PMAFIX Pro, PMAFIX, PMA Smart Line and accessories  
 EN 45545-2 HL2 (R22 & R23)

#### XVCSF Index

min.	max.
Ductility	
Fatigue reversed bending	
Compression resistance	
Low temperature performance	
Weathering resistance	


Materials	Temperature range	Colour
Outer layer: Specially formulated polyamide 6	-50°C to +105°C	Black/Blue
Inner layer: Specially modified polyamide 6	Short-term to: +160°C	
Certification	Fire performance	UV Resistance
Free from halogens and cadmium	Self-extinguishing	Very high (black)
RoHS and REACH compliant		

# PMA conduit for Rail/Infrastructure

## Type VAM & VAML conduit

Type VAM / PMAFLEX - Flexible, heavy-duty

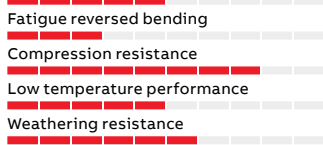


	Order no. (black)	Order no. (grey)	Conduit size NW	Inside Ø (mm)	Outside Ø (mm)	Stat. radius (mm)	PU (m)
	VAMT-10B.50	VAMT-10S.50	10	9.6	12.8	25	50
	VAMT-12B.50	VAMT-12S.50	12	12.0	15.6	30	50
	VAMG-17B.50	VAMG-17S.50	17	15.5	21.1	45	50
	VAMG-23B.50	VAMG-23S.50	23	21.6	28.4	60	50
	VAMG-29B.50	VAMG-29S.50	29	27.6	34.5	70	50
	VAMG-36B.30	VAMG-36S.30	36	35.8	42.4	85	30
	VAMG-48B.30	VAMG-48S.30	48	46.6	54.5	110	30

For high fire and passenger safety requirements in interior applications such as passenger areas or public buildings  
 HL3 acc. to EN 45545-2  
 NFPA 130 compliant  
 High impact and compression strength  
 High stiffness

### VAM Index


**min.** **max.**  
 Ductility



Materials	Temperature range	Colour
Specially formulated polyamide 6	-40°C to +105°C	Black/Grey
Certification	Short-term to: +160°C	UV Resistance
Free from halogens, REACH compliant and RoHS compliant	Fire performance	High (black)
	Minimal development of smoke and gases	

Type VAML / PMAFLEX - Flexible, medium-duty

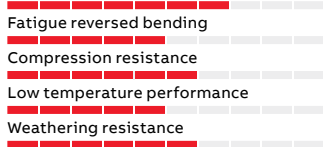


	Order no. (black)	Order no. (grey)	Conduit size NW	Inside Ø (mm)	Outside Ø (mm)	Stat. radius (mm)	PU (m)
	VAMLT-10B.50	VAMLT-10S.50	10	9.7	12.8	20	50
	VAMLT-12B.50	VAMLT-12S.50	12	12.1	15.6	25	50
	VAMLG-17B.50	VAMLG-17S.50	17	15.8	21.1	40	50
	VAMLG-23B.50	VAMLG-23S.50	23	21.9	28.4	50	50
	VAMLG-29B.50	VAMLG-29S.50	29	27.9	34.5	60	50
	VAMLG-36B.30	VAMLG-36S.30	36	36.2	42.4	75	30
	VAMLG-48B.30	VAMLG-48S.30	48	47.0	54.5	90	30
	VAMLG-56B.30	VAMLG-56S.30	56	56.9	67.5	120	30
	VAMLG-70B.10	VAMLG-70S.10	70	68.0	79.6	140	10
	VAMLG-95B.10	VAMLG-95S.10	95	92.5	107.0	190	10
	VAMLG-125B.06	VAMLG-125S.06	125	126.9	146.0	260	6

For high fire and passenger safety requirements in interior applications such as passenger areas or public buildings  
 HL3 acc. to EN 45545-2  
 NFPA 130 compliant  
 Good flexibility. Good impact strength

### VAML Index

**min.** **max.**  
 Ductility



Materials	Temperature range	Colour
Specially formulated polyamide 6	-40°C to +105°C	Black/Grey
Certification	Short-term to: +160°C	UV Resistance
Free from halogens, REACH compliant and RoHS compliant	Fire performance	High (black)
	Minimal development of smoke and gases	

## PMA conduit for Rail/Infrastructure

### Type PLR conduit

Type PLR / PMAFLEX - Flexible, medium-wall



	Order no. (black)	Order no. (grey)	Conduit size NW	Inside Ø (mm)	Outside Ø (mm)	Stat. radius (mm)	PU (m)
	PLRT-07B.50	PLRT-07S.50	07	6.8	10.0	15	50
	PLRT-10B.50	PLRT-10S.50	10	9.8	12.8	20	50
	PLRT-12B.50	PLRT-12S.50	12	12.2	15.6	25	50
	PLRG-17B.50	PLRG-17S.50	17	15.9	21.1	40	50
	PLRG-23B.50	PLRG-23S.50	23	22.0	28.4	50	50
	PLRG-29B.50	PLRG-29S.50	29	28.0	34.5	60	50
	PLRG-36B.30	PLRG-36S.30	36	36.3	42.4	75	30
	PLRG-48B.30	PLRG-48S.30	48	47.2	54.5	90	30

In light rail rolling stock applications e.g. Tram, Metro, Monorail  
HL2 acc. to EN 45545-2

Good pressure resistance

Very good fire safety characteristics

#### PLR Index

min. max.

Ductility

Fatigue reversed bending

Compression resistance

Low temperature performance

Weathering resistance

#### Materials

Specially modified polyamide 6

#### Certification

Free from halogens, REACH compliant  
and RoHS compliant

#### Temperature range

-40°C to +105°C

Short-term to: +160°C

#### Fire performance

Self-extinguishing / Very good

#### Colour

Black/Grey

#### UV Resistance


High (black)

## PMA conduit for Rail/Infrastructure

### Type XVCS1H & XVCS2H conduit

#### Type XVCS1H / PMAFLEX Multilayer - Flexible, heavy-duty



	Order no. (black/green)	Conduit size NW	Inside Ø (mm)	Outside Ø (mm)	Stat. radius (mm)	PU (m)
	XVCS1H-10BG.50	10	9.5	12.8	20	50
	XVCS1H-12BG.50	12	11.8	15.6	25	50
	XVCS1H-17BG.50	17	15.5	21.1	40	50
	XVCS1H-23BG.50	23	21.7	28.4	50	50
	XVCS1H-29BG.50	29	27.5	34.5	60	50
	XVCS1H-36BG.30	36	35.8	42.4	75	30
	XVCS1H-48BG.30	48	47.1	54.5	90	30


For track side applications and other exterior static applications  
Easy layouting through: High conduit ductility and formability / Low friction inner layer facilitates cable insertion  
Excellent impact characteristics at low temperatures

#### XVCS1H Index

min.	max.	Materials	Temperature range	Colour
Ductility		Outer layer: Specially formulated polyamide 6	-50°C to +90°C	Black/Green
Fatigue reversed bending		Intermediate layer: Specially bonding compound	Short-term to: +120°C	
Compression resistance		Inner layer: Specially modified polyolefin		
Low temperature performance		Certification	Atmospheric corrosion resistance	UV Resistance
Weathering resistance		Free from halogens, REACH compliant and RoHS compliant	Very good	Very high (black)

#### Type XVCS2H / PMAFLEX Multilayer - Flexible, heavy-duty



	Order no. (black/green)	Conduit size NW	Inside Ø (mm)	Outside Ø (mm)	Stat. radius (mm)	PU (m)
	XVCS2H-10BG.50	10	9.2	12.8	20	50
	XVCS2H-12BG.50	12	11.7	15.6	25	50
	XVCS2H-17BG.50	17	15.2	21.1	35	50
	XVCS2H-23BG.50	23	22.0	28.4	40	50
	XVCS2H-29BG.50	29	27.7	34.5	50	50
	XVCS2H-36BG.30	36	35.8	42.4	60	30
	XVCS2H-48BG.30	48	46.8	54.5	70	30

For track side applications and other exterior static applications with high UV exposure  
Easy layouting through: High conduit ductility and formability / Low friction inner layer facilitates cable insertion  
Excellent impact characteristics at low temperatures

#### XVCS2H Index

min.	max.	Materials	Temperature range	Colour
Ductility		Outer layer: Specially formulated polyamide 12	-50°C to +90°C	Black/Green
Fatigue reversed bending		Intermediate layer: Specially bonding compound	Short-term to: +120°C	
Compression resistance		Inner layer: Specially modified polyolefin		
Low temperature performance		Certification	Atmospheric corrosion resistance	UV Resistance
Weathering resistance		Free from halogens, REACH compliant and RoHS compliant	Excellent	Very high (black)

## PMA conduit for Robotics/Automation

### Type XR90 & XTPC conduit



#### Type XR90 / PMAFLEX Multilayer - Very flexible, medium-duty

	Order no. (black/red)	Conduit size NW	Inside Ø (mm)	Outside Ø (mm)	Stat./Dyn. radius (mm)	PU (m)
	XR90T-17BR.50	17	16.2	21.1	30/85	50
	XR90T-23BR.50	23	22.7	28.4	40/110	50
	XR90T-29BR.50	29	28.6	34.5	50/135	50
	XR90G-17BR.50	17	15.4	21.1	35/85	50
	XR90G-23BR.50	23	21.4	28.4	45/110	50
	XR90G-29BR.50	29	27.2	34.5	55/135	50
	XR90G-36BR.30	36	35.9	42.4	65/170	30
	XR90G-48BR.30	48	47.0	54.5	85/220	30
	XR90G-56BR.30	56	56.7	67.5	110/270	30
	XR90G-70BR.30	70	67.8	79.6	130/320	30
	XR90G-95BR.30	90	92.0	107.0	170/430	30

For dynamic conduit systems in robotics and automation industry  
 With wear indication function  
 High resistance to continuous bending, torsion, and elongation  
 No abrupt conduit failure due to high tear propagation resistance  
 High abrasion resistance  
 Suitable for applications with a pullback system  
 Long service life

#### XR90 Index

min.	max.
Ductility	
Fatigue reversed bending	
Compression resistance	
Low temperature performance	
Weathering resistance	

Materials	Temperature range	Colour
Outer layer: Specially formulated polyamide 12	-40°C to +95°C	Black/Red
Intermediate layer: Specially formulated polyamide	Short-term to: +150°C	
Inner layer: Specially formulated polyamide 12		
Certification	Fire performance	UV Resistance
Free from halogens, REACH compliant and RoHS compliant	Self-extinguishing	High (black)

#### Type XTPC / PMAFLEX Multilayer- Highly flexible, medium-duty



	Order no. (black/orange)	Conduit size NW	Inside Ø (mm)	Outside Ø (mm)	Stat./Dyn. radius (mm)	PU (m)
	XTPCG-17BB.50	17	15.2	21.1	30/75	50
	XTPCG-23BB.50	23	21.2	28.4	40/100	50
	XTPCG-29BB.50	29	26.8	34.5	50/120	50
	XTPCG-36BB.50	36	35.5	42.4	60/150	30
	XTPCG-48BB.30	48	46.5	54.5	80/190	30
	XTPCG-56BB.30	56	56.2	67.5	105/235	30
	XTPCG-70BB.30	70	67.3	79.6	120/280	30

For dynamic conduit systems in robotics and automation industry  
 For outdoor applications with good requirements to UV and weathering resistance  
 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 torsion  
 Suitable for tight bending-radii  
 Long service life

#### XTPC Index

min.	max.
Ductility	
Fatigue reversed bending	
Compression resistance	
Low temperature performance	
Weathering resistance	

Materials	Temperature range	Colour
Outer layer: Thermoplastic copolyester	-40°C to +105°C	Black/Blue
Inner layer: Thermoplastic copolyester	Short-term to: +150°C	
Certification	Fire performance	UV Resistance
Free from halogens, REACH compliant and RoHS compliant	Self-extinguishing	High (black)

# PMA conduit for Robotics/Automation

Type PIS/PIH conduit



Type PIS/PIH / PMAFLEX - Highly flexible, medium- and heavy-duty

	Order no. (black)	Order no. (grey)	Conduit size NW	Inside Ø (mm)	Outside Ø (mm)	Stat./dyn. radius (mm)	PU (m)
	PIST-07B.50	PIST-07S.50	07	6.7	10.0	15/40	50
	PIST-10B.50	PIST-10S.50	10	9.7	12.8	20/50	50
	PIST-12B.50	PIST-12S.50	12	12.0	15.6	25/65	50
	PIST-17B.50	PIST-17S.50	17	16.7	21.1	30/85	50
	PIST-23B.50	PIST-23S.50	23	23.2	28.4	40/110	50
	PIST-29B.50	PIST-29S.50	29	28.9	34.5	50/135	50
	PIST-36B.30	PIST-36S.30	36	36.8	42.4	60/170	30
	PIST-48B.30	PIST-48S.30	48	48.0	54.5	75/220	30
	PISG-17B.50	PISG-17S.50	17	15.8	21.1	35/85	50
	PISG-23B.50	PISG-23S.50	23	22.0	28.4	45/110	50
	PISG-29B.50	PISG-29S.50	29	27.8	34.5	55/135	50
	PISG-36B.30	PISG-36S.30	36	36.2	42.4	65/170	30
	PISG-48B.30	PISG-48S.30	48	47.1	54.5	85/220	30
	PIHG-56B.30	PIHG-56S.30	56	57.0	67.5	110/270	30
	PIHG-70B.30	PIHG-70S.30	70	68.0	79.6	130/320	30
	PIHG-95B.30	PIHG-95S.30	95	92.5	107.0	170/430	30
	PIHG-125B.20	PIHG-125S.20	125	126.9	146.0	230/580	20

**Approvals**



For robotics and automation applications. UL 94 V0. Excellent UV resistance and weathering characteristics  
 PIS: Medium-wall (Nominal width 07 to 48) / PIH: Heavy-wall (Nominal width 56 to 125)  
 Very good reversed bending characteristics. Good mechanical characteristics even under extreme conditions, such as low temperatures and low humidity

**PIS/PIH Index**

min.	max.
Ductility	
Fatigue reversed bending	
Compression resistance	
Low temperature performance	
Weathering resistance	

Materials	Temperature range	Colour
Specially modified polyamide 12	-50°C to +95°C	Black/Grey
Certification	Short-term to: +150°C	UV Resistance
Free from halogens, REACH compliant and RoHS compliant	Weathering characteristics	Very high (black)
	Excellent	

## PMA conduit for Robotics/Automation

### Type POS & PUE conduit



Type POS / PMAFLEX - Highly flexible, medium-duty

	Order no. (black)	Conduit size NW	Inside Ø (mm)	Outside Ø (mm)	Stat./Dyn. radius (mm)	PU (m)
	POST-10B.50	10	9.9	12.8	20/50	50
	POST-12B.50	12	12.1	15.6	35/75	50
	POST-17B.50	17	16.7	21.1	30/85	50
	POST-23B.50	23	23.2	28.4	40/110	50
	POST-29B.50	29	28.8	34.5	50/135	50
	POST-36B.30	36	36.6	42.4	60/170	30
	POST-48B.30	48	48.2	54.5	75/220	30
	POSG-29B.30	29	27.8	34.4	55/135	50
	POSG-36B.30	36	36.2	42.4	65/170	30
	POSG-48B.30	48	47.2	54.5	85/220	30
	POSG-70B.30	70	67.4	79.6	130/320	30
	POSG-95B.30	95	92.3	106.0	170/430	30

#### POS Index

For automation as well as for machine building and industrial installations, especially where continuous movements occur  
Excellent reversed bending performance and flexibility  
Good impact resistance. Good resistance against strong acids

min.	max.
Ductility	
Fatigue reversed bending	
Compression resistance	
Low temperature performance	
Weathering resistance	

Materials	Temperature range	Colour
Specially modified polypropylene	-25°C to +95°C	Black
Certification	Short-term to: +130°C	
Free from halogens, REACH compliant and RoHS compliant	Fatigue resistance	UV Resistance
	-	Medium (black)

Type PUE / PMAFLEX - Highly flexible, medium-duty



	Order no. (black)	Conduit size NW	Inside Ø (mm)	Outside Ø (mm)	Stat./Dyn. radius (mm)	PU (m)
	PUET-23B.50	23	23.1	28.4	40/75	50
	PUET-29B.30	29	29.0	34.5	45/90	30
	PUET-36B.30	36	36.8	42.4	55/110	30
	PUET-48B.21	48	48.4	54.5	70/140	21
	PUEG-56B.30	56	57.2	67.5	90/170	30
	PUEG-70B.30	70	68.4	79.6	105/220	30

For robotic applications with multi-axial movements  
Specially suitable for tight bending-radii  
Highest reversed bending resistance  
Excellent chafing characteristics

#### PUE Index

min.	max.
Ductility	
Fatigue reversed bending	
Compression resistance	
Low temperature performance	
Weathering resistance	

Materials	Temperature range	Colour
Specially formulated polyurethane	-60°C to +50°C	Black
Certification		
Free from halogens, REACH compliant and RoHS compliant	Fatigue resistance	UV Resistance
	-	High (black)



# PMA conduit for Robotics/Automation

## Type ESD conduit



Type ESD / PMAFLEX - Very flexible, medium-duty conduit

	Order no. (black)	Conduit size NW	Inside Ø (mm)	Outside Ø (mm)	Stat./Dyn. radius (mm)	PU (m)
	ESDT-07B.50	07	6.7	10.0	15/40	50
	ESDT-10B.50	10	9.7	12.8	20/50	50
	ESDT-12B.50	12	12.0	15.6	25/65	50
	ESDT-17B.50	17	16.6	21.1	35/85	50
	ESDT-23B.50	23	23.0	28.4	40/110	50
	ESDT-29B.50	29	28.7	34.5	50/135	50
	ESDT-36B.30	36	36.8	42.4	60/170	30
	ESDT-48B.30	48	48.0	54.5	75/220	30
	ESDG-56B.30	56	55.8	67.5	110/270	30
	ESDG-70B.10	70	67.4	79.6	130/320	10
	ESDG-95B.10	95	91.5	107.0	170/430	10

For dynamic applications in robotics and automation where electrostatic charge and uncontrolled discharge need to be avoided  
Prevents electrostatic charging. For indoor and outdoor use (very good cold temperature performance)

### ESD Index

	min.	max.
Ductility	[Progressive bar chart]	
Fatigue reversed bending	[Progressive bar chart]	
Compression resistance	[Progressive bar chart]	
Low temperature performance	[Progressive bar chart]	
Weathering resistance	[Progressive bar chart]	

Materials	Temperature range	Colour
Specially modified polyamide 12	-40°C to +90°C	Black
Certification	Short-term to: +150°C	
Free from halogens, REACH compliant and RoHS compliant	Fatigue resistance	UV Resistance
	Excellent fatigue resistance	Very high (black)

## PMA conduit for Machine Building

### Type XPCL & XSOL conduit



Type XPCL / PMAFLEX Multilayer - Highly flexible, medium-duty

	Order no. (black/blue)	Order no. (grey/blue)	Conduit size NW	Inside Ø (mm)	Outside Ø (mm)	Stat. radius (mm)	PU (m)
	XPCLT-10BB.50	XPCLT-10SB.50	10	9.6	12.8	20	50
	XPCLT-12BB.50	XPCLT-12SB.50	12	11.9	15.6	25	50
	XPCLT-17BB.50	XPCLT-17SB.50	17	16.5	21.1	35	50
	XPCLG-17BB.50	XPCLG-17SB.50	17	15.7	21.1	40	50
	XPCLG-23BB.50	XPCLG-23SB.50	23	21.9	28.4	50	50
	XPCLG-29BB.50	XPCLG-29SB.50	29	27.6	34.5	60	50
	XPCLG-36BB.30	XPCLG-36SB.30	36	36.0	42.4	75	30
	XPCLG-48BB.30	XPCLG-48SB.30	48	47.1	54.5	90	30

For machine building and equipment with high requirements  
 Allows easy cable insertion due to low friction inner layer  
 Very good ductility and good reversed bending characteristics  
 Good mechanical characteristics even under extreme conditions, such as low temperatures and low humidity

#### XPCL Index

min.	max.
Ductility	
Fatigue reversed bending	
Compression resistance	
Low temperature performance	
Weathering resistance	

Materials	Temperature range	Colour
Outer layer: Specially formulated polyamide 6	-50°C to +105°C	Black/Blue
Intermediate layer: Specially bonding	Short-term to: +160°C	Grey/Blue
Inner layer: Specially modified polyethylene		
Certification	Fire performance	UV Resistance
Free from halogens, REACH compliant and RoHS compliant	Self-extinguishing	High (black)

Type XSOL / PMAFLEX Multilayer - Highly flexible, medium-duty



	Order no. (black/green)	Conduit size NW	Inside Ø (mm)	Outside Ø (mm)	Stat. radius (mm)	PU (m)
	XSOLT-10BG.50	10	9.5	12.8	20	50
	XSOLT-12BG.50	12	11.9	15.6	25	50
	XSOLG-17BG.50	17	15.6	21.1	40	50
	XSOLG-23BG.50	23	21.9	28.4	50	50
	XSOLG-29BG.50	29	27.7	34.5	60	50
	XSOLG-36BG.30	36	36.4	42.4	75	30
	XSOLG-48BG.30	48	47.2	54.5	90	30

All-purpose, especially in long-term external applications, e.g. energy technology  
 Very good resistance to UV and weathering  
 Very high ductility and reversed bending resistance  
 Very good mechanical strength  
 High impact resistance even under extreme conditions, such as low temperatures and low humidity

#### Approvals



#### XSOL Index

min.	max.
Ductility	
Fatigue reversed bending	
Compression resistance	
Low temperature performance	
Weathering resistance	


Materials	Temperature range	Colour
Outer layer: Specially formulated polyamide 12	-50°C to +95°C	Black/Green
Intermediate layer: Specially bonding compound	Short-term to: +150°C	
Inner layer: Specially modified polyamide 6		
Certification	Fire performance	UV Resistance
Free from halogens, REACH compliant and RoHS compliant	Good fire safety characteristics Self-extinguishing	High (black)

# PMA conduit for Machine Building

## Type VCS & VOH conduit

Type VCS / PMAFLEX - Flexible, heavy-duty



	Order no. (black)	Order no. (grey)	Conduit size NW	Inside Ø (mm)	Outside Ø (mm)	Stat. radius (mm)	PU (m)
VCS	VCST-07B.100	VCST-07S.100	07	6.6	10.0	20	100
	VCST-10B.50	VCST-10S.50	10	9.6	12.8	25	50
	VCST-12B.50	VCST-12S.50	12	12.0	15.6	30	50
	VCST-17B.50	VCST-17S.50	17	16.5	21.1	40	50
	VCSG-17B.50	VCSG-17S.50	17	15.7	21.1	45	50
	VCSG-23B.50	VCSG-23S.50	23	21.8	28.4	60	50
	VCSG-29B.50	VCSG-29S.50	29	27.6	34.5	70	50
	VCSG-36B.30	VCSG-36S.30	36	35.7	42.4	85	30
	VCSG-48B.30	VCSG-48S.30	48	46.7	54.5	110	30
	VCSG-56B.30	VCSG-56S.30	56	56.2	67.5	135	30
	VCSG-70B.10	VCSG-70S.10	70	67.1	79.6	160	10
	VCSG-95B.10	VCSG-95S.10	95	91.0	107.0	220	10

**VCS Index**

**min.** Ductility

**max.**

Fatigue reversed bending

Compression resistance

Low temperature performance


Weathering resistance

For static external installations  
High compression and impact strengths at low temperatures and low humidity  
Good ductility. Very good resistance to ultra violet rays and weathering

Materials	Temperature range	Colour
Specially formulated polyamide 6	-50°C to +105°C	Black/Grey
Certification	Fatigue resistance	UV Resistance
Free from halogens, REACH compliant and RoHS compliant	Short-term to: +160°C	High (black)

Type VOH / PMAFLEX - Pliable, very heavy-duty



	Order no. (black)	Order no. (grey)	Conduit size NW	Inside Ø (mm)	Outside Ø (mm)	Stat. radius (mm)	PU (m)
VOH	VOHD-07B.50	VOHD-07S.50	07	6.3	10.0	20	50
	VOHD-10B.50	VOHD-10S.50	10	9.5	12.8	25	50
	VOHD-12B.50	VOHD-12S.50	12	11.9	15.6	30	50
	VOHG-17B.50	VOHG-17S.50	17	15.1	21.1	45	50
	VOHG-23B.50	VOHG-23S.50	23	21.6	28.4	60	50
	VOHG-29B.50	VOHG-29S.50	29	27.3	34.5	70	50
	VOHG-36B.30	VOHG-36S.30	36	35.6	42.4	85	30
	VOHG-48B.30	VOHG-48S.30	48	46.5	54.5	110	30
	VOHG-56B.10	VOHG-56S.10	56	55.7	67.5	135	10
	VOHG-70B.10	VOHG-70S.10	70	67.0	79.6	160	10
	VOHG-95B.10	VOHG-95S.10	95	91.3	107.0	220	10
	VOHG-125B.06	VOHG-125S.06	125	125.4	146.0	300	6

**VOH Index**

**min.** Ductility

**max.**

Fatigue reversed bending

Compression resistance

Low temperature performance

Weathering resistance

For applications in heavy machine and plant construction  
High compression resistance  
Highest degree of mechanical protection  
Very good UV and weathering resistance  
Good fire safety characteristics

Materials	Temperature range	Colour
Specially modified polyamide 6	-40°C to +105°C	Black/Grey
Certification	Fire performance	UV Resistance
Free from halogens, REACH compliant and RoHS compliant	Short-term to: +160°C Good	High (black)

# PMA conduit for Machine Building

## Type PCL conduit

Type PCL / PMAFLEX - Very flexible, medium-duty



	Order no. (black)	Order no. (grey)	Conduit size NW	Inside Ø (mm)	Outside Ø (mm)	Stat. radius (mm)	PU (m)
	PCLT-07B.50	PCLT-07S.50	07	6.6	10.0	15	50
	PCLT-10B.50	PCLT-10S.50	10	9.8	12.8	20	50
	PCLT-12B.50	PCLT-12S.50	12	12.1	15.6	25	50
	PCLT-17B.50	PCLT-17S.50	17	16.8	21.1	35	50
	PCLT-23B.50	PCLT-23S.50	23	23.2	28.4	45	50
	PCLT-29B.50	PCLT-29S.50	29	28.8	34.5	55	50
	PCLT-36B.30	PCLT-36S.30	36	36.7	42.4	65	30
	PCLT-48B.30	PCLT-48S.30	48	48.2	54.5	80	30
	PCLG-17B.50	PCLG-17S.50	17	15.8	21.1	40	50
	PCLG-23B.50	PCLG-23S.50	23	21.9	28.4	50	50
	PCLG-29B.50	PCLG-29S.50	29	27.8	34.5	60	50
	PCLG-36B.30	PCLG-36S.30	36	36.1	42.4	75	30
	PCLG-48B.30	PCLG-48S.30	48	46.9	54.5	90	30
	PCLG-56B.30	PCLG-56S.30	56	56.7	67.5	120	30
	PCLG-70B.10	PCLG-70S.10	70	67.5	79.6	140	10
PCLG-95B.10	PCLG-95S.10	95	91.6	107.0	190	10	
PCLG-125B.06	PCLG-125S.06	125	125.5	146.0	260	6	

### Approvals



### PCL Index

min.	max.
Ductility	
Fatigue reversed bending	
Compression resistance	
Low temperature performance	
Weathering resistance	

For machine building, installation and vehicle building industries / static and slightly dynamic applications  
 Very good ductility and good reversed bending characteristics. Very good long-term properties  
 Very good mechanical characteristics even under extreme conditions, such as low temperatures and low humidity

Materials	Temperature range	Colour
Specially formulated polyamide 6	-50°C to +105°C	Black/Grey
Certification	Self extinguishing	UV Resistance
Free from halogens, REACH compliant and RoHS compliant	Short-term to: +160°C acc. to UL 94 V2	High (black)

# PMA conduit for Machine Building

## Type CYL & PEL conduit



Type CYL / PMAFLEX - Very flexible, medium-duty conduit

	Order no. (black)	Order no. (grey)	Conduit size NW	Inside Ø (mm)	Outside Ø (mm)	Stat. radius (mm)	PU (m)
	CYLT-07B.50	CYLT-07S.50	07	6.6	10.0	15	50
	CYLT-10B.50	CYLT-10S.50	10	9.8	12.8	20	50
	CYLT-12B.50	CYLT-12S.50	12	12.1	15.6	25	50
	CYLT-17B.50	CYLT-17S.50	17	16.8	21.1	35	50
	CYLT-23B.50	CYLT-23S.50	23	23.2	28.4	45	50
	CYLT-29B.50	CYLT-29S.50	29	28.8	34.5	55	50
	CYLT-36B.30	CYLT-36S.30	36	36.7	42.4	65	30
	CYLT-48B.30	CYLT-48S.30	48	48.2	54.5	80	30
	CYLG-23B.50	CYLG-23S.50	23	21.9	28.4	50	50
	CYLG-29B.50	CYLG-29S.50	29	27.8	34.5	60	50
	CYLG-36B.30	CYLG-36S.30	36	36.1	42.4	75	30
	CYLG-48B.30	CYLG-48S.30	48	46.9	54.5	90	30
	CYLG-56B.30	CYLG-56S.30	56	56.7	67.5	120	30
	CYLG-70B.10	CYLG-70S.10	70	67.5	79.6	140	10
	CYLG-95B.10	CYLG-95S.10	95	91.6	107.0	190	10
	CYLG-125B.06	CYLG-125S.06	125	125.5	146.0	260	06

**Approvals**



**CYL Index**

min.	max.
Ductility	
Fatigue reversed bending	
Compression resistance	
Low temperature performance	
Weathering resistance	

For machine building and installation industries / static and slightly dynamic applications  
 Very good ductility and good reversed bending characteristics  
 Good mechanical characteristics even under extreme conditions, such as low temperatures and low humidity

Materials	Temperature range	Colour
Specially formulated polyamide 6	-40°C to +105°C	Black/Grey
Certification	Self extinguishing	UV Resistance
Free from halogens, REACH compliant and RoHS compliant	Short-term to: +160°C	High (black)
	acc. to UL 94 V2	

Type PEL / PMAFLEX - Highly flexible, light-duty, soft



	Order no. (grey)	Order no. (grey, slit)	Conduit size NW	Inside Ø (mm)	Outside Ø (mm)	Stat. radius (mm)	PU (m)
	PELT-10S.50	PELT-10SL.50	10	9.8	12.8	20	50
	PELT-12S.50	PELT-12SL.50	12	12.2	15.6	25	50
	PELT-17S.50	PELT-17SL.50	17	16.8	21.1	30	50
	PELT-23S.50	PELT-23SL.50	23	23.2	28.4	40	50
	PELT-29S.30	PELT-29SL.30	29	28.9	34.5	45	30
	PELT-36S.30	PELT-36SL.30	36	37.0	42.4	55	30
	PELT-48S.30	PELT-48SL.30	48	48.2	54.5	70	30

**PEL Index**

min.	max.
Ductility	
Fatigue reversed bending	
Compression resistance	
Low temperature performance	
Weathering resistance	

For electrical cabinets and appliance construction  
 Very good ductility  
 Suitable for small bending radii  
 Good resistance against strong acids and bases


Materials	Temperature range	Colour
Specially modified polyethylene	-50°C to +60°C	Grey
Certification	Self extinguishing	UV Resistance
Free from halogens, REACH compliant and RoHS compliant		Medium (black)

# PMA conduit for Machine Building

## Type JLLPA conduit



Type JLLPA / PMA Overextruded - Flexible, heavy-duty

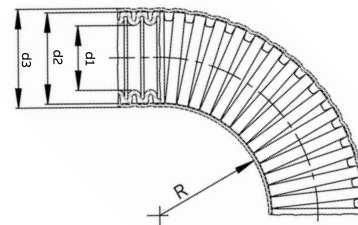
	Order no. (black)	Conduit size NW	d1 (mm)	d2 (mm)	d3 (mm)	Stat. radius (mm)	PU (m)
	JLLPA-12A.50	12	12.1	15.6	15.8	40	50
	JLLPAG-17A.50	17	15.8	21.1	21.2	55	50
	JLLPAG-23A.50	23	21.9	28.4	28.5	75	50
	JLLPAG-29A.50	29	27.8	34.5	34.7	90	50
	JLLPAG-36A.30	36	36.1	42.4	42.6	110	30
	JLLPAG-48A.30	48	46.9	54.5	54.6	140	30

Flexible, smooth over-extruded conduit for applications with cleaning requirements  
 For static applications in machine building, installation and construction industries  
 For general applications with cleaning requirements  
 Smooth outer layer for easy cleaning, good resistance to chemicals and cleaning agents. Corrosion free  
 Flexibility in combination with high strength. Compatible with PMAFIX Pro  
 UL Recognition according to UL 1696 (file E80294)

### JLLPA Index

min.	max.
Ductility	
Fatigue reversed bending	
Compression resistance	
Low temperature performance	
Weathering resistance	

Materials	Temperature range	Colour
Conduit: High-grade, specially formulated polyamide 6	-18°C to +105°C	Black
Overextrusion: modified polyamide 6	Short-term to: +160°C	
Certification	Fire performance	UV Resistance
Free from halogens and cadmium	Self-extinguishing	High (black)
RoHS and REACH compliant		



## PMA conduits for special applications

### Type PHT & POH conduit

Type PHT / PMAFLEX Pro - Highly flexible, medium/heavy-duty



	Order no. (black)	Conduit size NW	Inside Ø (mm)	Outside Ø (mm)	Stat./Dyn. radius (mm)	PU (m)
	PHTT-07B.50	07	6.7	10.0	15/40	50
	PHTT-10B.50	10	9.7	12.8	20/50	50
	PHTT-12B.50	12	12.1	15.6	25/65	50
	PHTT-17B.50	17	16.8	21.1	35/85	50
	PHTT-23B.50	23	23.3	28.4	45/110	50
	PHTG-17B.50	17	15.6	21.1	40/85	50
	PHTG-23B.50	23	22.0	28.4	50/110	50
	PHTG-29B.50	29	27.9	34.5	60/135	50
	PHTG-36B.30	36	36.2	42.4	75/170	30
	PHTG-48B.30	48	47.3	54.5	90/220	30

#### PHT Index

min.	max.
Ductility	
Fatigue reversed bending	
Compression resistance (PHTT-17B)	
Compression resistance (PHTG-17B)	
Low temperature performance	
Weathering resistance	

For applications at high and very low temperatures / dynamic applications  
Specially formulated polyamide elastomer. Both excellent flexibility and high compression strength  
Enhanced temperature range compared to standard polyamides  
High resistance to ultra violet rays and weathering

Materials	Temperature range	Colour
Specially formulated polyamide elastomer	-50°C to +135°C	Black
Certification	Impact resistance	UV Resistance
Free from halogens, REACH compliant and RoHS compliant	Short-term to: +180°C Extremely good at low temperatures	High (black)

Type POH / PMAFLEX Pro - Very flexible, medium-duty



	Order no. (black)	Conduit size NW	Inside Ø (mm)	Outside Ø (mm)	Stat. radius (mm)	PU (m)
	POHT-10B.50	10	10.0	12.8	20	50
	POHT-12B.50	12	12.3	15.6	25	50
	POHG-17B.50	17	16.0	21.1	40	50
	POHG-23B.50	23	22.1	28.4	50	50
	POHG-29B.50	29	28.0	34.5	60	50
	POHG-36B.30	36	36.4	42.4	75	30
	POHG-48B.30	48	47.0	54.5	90	30

#### POH Index

min.	max.
Ductility	
Fatigue reversed bending	
Compression resistance	
Low temperature performance	
Weathering resistance	

For highest fire and passenger safety requirements  
Excellent fire safety characteristics acc. to BS 6853 1a (interior)  
Good ductility and reversed bending characteristics


Materials	Temperature range	Colour
Specially modified polypropylene	-25°C to +95°C	Black
Certification	Fire performance	UV Resistance
Free from halogens, REACH compliant and RoHS compliant	Short-term to: +120°C acc. to BS 6853 1a (interior)	High (black)

# PMA conduit for hazardous area

## Type XESX conduit

Type XESX / PMA Ex-System - Flexible, heavy-grade



	Order no. (black/yellow)	Conduit size NW	Inside Ø (mm)	Outside Ø (mm)	Stat./Dyn. radius (mm)	PU (m)
	XESX0250.50	10	9.2	12.8	25/65	50
	XESX0350.50	12	11.8	15.6	30/70	50
	XESX0450.50	17	15.2	21.1	35/85	50
	XESX0550.50	23	22.0	28.4	40/110	50
	XESX0650.50	29	27.5	34.5	50/130	50
	XESX0730.30	36	35.8	42.4	60/180	30
	XESX0830.30	48	46.8	54.5	70/220	30

Flexible, anti-static conduit ideal for hazardous areas such as explosion endangered zones  
 For indoor and outdoor applications in hazardous areas  
 Electrostatically discharging  
 Excellent mechanical characteristics, also under extreme climatic conditions as low temperature  
 High abrasion resistance

### Approvals



EC TYPE Examination Certificate for use with EXPQ metallic fittings:  
 Baseefa 08 ATEX 0003X, IECEx BAS 8.0001X  
 Ex e IIC Gb  
 Ex tb IIIC Db  
 EC TYPE Examination Certificate for use with non metallic fittings and accessories:  
 SEV 15 ATEX 0121X, IECEx SEV 15.0009X  
 Ex eb IIC Gb  
 Ex tb IIIC Db

### XESX Index

min.		max.
Ductility	<b>Materials</b>	<b>Temperature range</b>
Fatigue reversed bending	Outer layer: Dissipative PA12	-50°C to +90°C
Compression resistance	Inner layer: Impact resistant HDPE	Short-term to: +150°C
Low temperature performance	<b>Certification</b>	<b>Fire performance</b>
Weathering resistance	Free from halogens, REACH compliant and RoHS compliant	Self-extinguishing
		<b>UV Resistance</b>
		Very high (black)



# PMA conduit for Food & Beverage

## Type JFBD conduit



Type JFBD / PMA Overextruded - Flexible, medium-duty

	Order no.	Conduit size NW	Inside Ø (mm)	Outside Ø (mm)	Stat./Dyn. radius (mm)	PU (mm)
	JFBDT-12C01.50	12	12.0	16.0	40/100	50
	JFBDG-17C01.50	17	15.7	21.5	55/125	50
	JFBDG-23C01.50	23	21.8	28.7	75/170	50
	JFBDG-29C01.50	29	27.6	34.9	90/210	50
	JFBDG-36C01.30	32	36.3	43.0	110/260	30
	JFBDG-48C01.30	48	47.3	54.8	140/330	30

Smooth easy to clean out layer  
 High reversed bending stresses  
 Excellent flexibility in combination with high strength  
 High resistance to chemicals and cleaning agents  
 For indoor food zone – non contact  
 Outer layer made from FDA compliant material  
 Corrosion free

### Approvals



### JFBD Index

min.	max.	Materials	Colour
Ductility		Conduit: made from high-grade, specially formulated polyamide 12	Corrugated conduit: blue
Fatigue reversed bending		Overextrusion: made from modified polyamide elastomer	Overextrusion: blue, translucent
Compression resistance		<b>Certification</b>	<b>UV Resistance</b>
Low temperature performance		FDA 21 CFR / EU 10/2011 compliant outer layer material; ECOLAB certificate	Medium
Weathering resistance			

# PMA conduit for UL-Listing requirements

## Type CUS conduit



Type CUS / PMA conduit for UL-Listing requirements - Very flexible, medium-duty

	Order no. (black)	Conduit size		Inside Ø (mm)	Outside Ø (mm)	Stat. radius (mm)	PU (m/ft)
		Inch	NW				
	CUSG-17B.31	½	17	15.5	21.1	40	31/100
	CUSG-23B.31	¾	23	21.7	28.4	50	31/100
	CUSG-29B.31	1	29	27.4	34.5	60	31/100
	CUSG-36B.31	1¼	36	35.5	42.4	75	31/100
	CUSG-48B.31	1½	48	46.5	54.5	90	31/100

For machine building and installation industries  
 For electrical installations, especially in the US market  
 Inexpensive solution for requirements acc. to UL 1660 (UL Listing)  
 Good ductility and reversed bending characteristics  
 Very good mechanical properties even under extreme conditions, such as low temperatures and low humidity

### Approvals



### CUS Index

min.	max.
Ductility	
Fatigue reversed bending	
Compression resistance	
Low temperature performance	
Weathering resistance	

Materials	Temperature range	Colour
Specially modified polyamide 6	-40°C to +105°C	Black
Certification	Short-term to: +160°C	UV Resistance
Free from halogens, REACH compliant and RoHS compliant	Fire protection	High (black)
	Self-extinguishing, acc. to UL 94 V2	

# PMA conduit for UL-Listing requirements

## Type PUS conduit

Type PUS / PMAFLEX Plus - Very flexible, heavy-duty



	Order no. (black)	Conduit size		Inside Ø (mm)	Outside Ø (mm)	Stat./Dyn. radius (mm)	PU (m/ft)
		Inch	NW				
	PUSG-17B.31	½	17	15.5	21.1	35/85	31/100
	PUSG-23B.31	¾	23	21.6	28.4	45/110	31/100
	PUSG-29B.31	1	29	27.5	34.5	55/135	31/100
	PUSG-36B.31	1 ¼	36	35.9	42.4	65/170	31/100
	PUSG-48B.31	1 ½	48	47.0	54.5	85/220	31/100

For long-term external applications with approval acc. to UL 1660 (UL Listing)  
 For dynamic applications  
 Very good reversed bending resistance  
 Very good mechanical strength at low temperatures  
 Excellent resistance to ultra violet rays and weathering  
 cULus listed

### Approvals



### PUS Index

min. max.

Ductility	
Fatigue reversed bending	
Compression resistance	
Low temperature performance	
Weathering resistance	



<b>Materials</b>	<b>Temperature range</b>	<b>Colour</b>
Specially modified polyamide 12	-50°C to +95°C	Black
<b>Certification</b>	<b>Fire protection</b>	<b>UV Resistance</b>
Free from halogens, REACH compliant and RoHS compliant	Short-term to: +150°C Self-extinguishing, acc. to UL 94 V2	Very high (black)

# PMA conduit for general applications

## Type LLPA conduit

Type LLPA / PMA Smart Line - Very flexible, medium-duty Smartline



	Order no. (black)	Order no. (grey)	Conduit size NW	Inside Ø (mm)	Outside Ø (mm)	Stat. radius (mm)	PU (m)
	LLPA-07A.50	LLPA-07S.50	07	6.6	10.0	15	50
	LLPA-10A.50	LLPA-10S.50	10	9.8	12.8	20	50
	LLPA-12A.50	LLPA-12S.50	12	12.1	15.6	25	50
	LLPA-17A.50	LLPA-17S.50	17	16.8	21.1	35	50
	LLPA-23A.50	LLPA-23S.50	23	23.2	28.4	45	50
	LLPA-29A.50	LLPA-29S.50	29	28.8	34.5	55	50
	LLPA-36A.30	LLPA-36S.30	36	36.7	42.4	65	30
	LLPA-48A.30	LLPA-48S.30	48	48.2	54.5	80	30
	LLPAG-17A.50	LLPAG-17S.50	17	15.8	21.1	40	50
	LLPAG-23A.50	LLPAG-23S.50	23	21.9	28.4	50	50
	LLPAG-29A.50	LLPAG-29S.50	29	27.8	34.5	60	50
	LLPAG-36A.30	LLPAG-36S.30	36	36.1	42.4	75	30
	LLPAG-48A.30	LLPAG-48S.30	48	46.9	54.5	90	30
	LLPAG-56A.30	LLPAG-56S.30	56	56.7	67.5	120	30
	LLPAG-70A.10	LLPAG-70S.10	70	67.5	79.6	140	10
	LLPAG-95A.10	LLPAG-95S.10	95	91.6	107.0	190	10
	LLPAG-125A.06	LLPAG-125S.06	125	125.5	146.0	260	06

**Approvals**



**LLPA Index**

	min.	max.
Ductility	██████████	██████████
Fatigue reversed bending	██████████	██████████
Compression resistance	██████████	██████████
Low temperature performance	██████████	██████████
Weathering resistance	██████████	██████████

For machine building, installation and construction industries  
 Good ductility  
 Good mechanical characteristics

Materials	Temperature range	Colour
Specially modified polyamide 6	-40°C to +105°C	Black/Grey
Certification	Self extinguishing	UV Resistance
Free from halogens, REACH compliant and RoHS compliant	Short-term to: +160°C acc. to UL 94 V2	High (black)

# PMA conduit for general applications

## Type LLPF conduit

Type LLPF / PMA Smart Line - Very flexible, medium-duty



	Order no. (black)	Order no. (grey)	Conduit size NW	Inside Ø (mm)	Outside Ø (mm)	Stat. radius (mm)	PU (m)
	LLPF-07A.50	LLPF-07S.50	7	6.8	10.0	15	50
	LLPF-10A.50	LLPF-10S.50	10	9.8	12.8	20	50
	LLPF-12A.50	LLPF-12S.50	12	12.2	15.6	25	50
	LLPF-17A.50	LLPF-17S.50	17	16.8	21.1	35	50
	LLPF-23A.50	LLPF-23S.50	23	23.4	28.4	45	50
	LLPF-29A.50	LLPF-29S.50	29	29.1	34.5	55	50
	LLPFG-17A.50	LLPFG-17S.50	17	15.8	21.1	40	50
	LLPFG-23A.50	LLPFG-23S.50	23	21.9	28.4	50	50
	LLPFG-29A.50	LLPFG-29S.50	29	27.8	34.5	60	50
	LLPFG-36A.30	LLPFG-36S.30	36	36.1	42.4	75	30
	LLPFG-48A.30	LLPFG-48S.30	48	46.9	54.5	90	30

For machine building, installation and construction industries  
 For applications with high fire safety requirements  
 UL 94 V0  
 Good pressure resistance  
 Very good fire safety characteristics

### LLPF Index

min.	max.
Ductility	
Fatigue reversed bending	
Compression resistance	
Low temperature performance	
Weathering resistance	


Materials	Temperature range	Colour
Specially modified polyamide 6	-40°C to +105°C	Black/Grey
Certification	Short-term to: +160°C	UV Resistance
Free from halogens, REACH compliant and RoHS compliant	Fire protection	High (black)
	Self-extinguishing	

# PMA conduits for retrofit applications

## Type PACOF & PPCOF conduit



Type PACOF / PMA Divisible System - Flexible, divisible

	Order no. (black)	Conduit size NW	Inside Ø (mm)	Outside Ø (mm)	Stat. radius (mm)	PU (m)
	PACOF-07B.50	07	5.6	10.0	30	50
	PACOF-10B.50	10	8.5	12.8	33	50
	PACOF-12B.50	12	11.0	15.6	35	50
	PACOF-17B.50	17	15.5	21.1	45	50
	PACOF-23B.50	23	22.1	28.4	70	50
	PACOF-29B.50	29	27.2	34.5	120	50
	PACOF-36B.30	36	32.0	42.4	145	30
	PACOF-48B.30	48	43.9	54.1	150	30
	PACOF-70B.10	70	62.0	79.0	190	10

HL3 according to EN45545-2  
 NFPA 130 compliant  
 For machine building and plant construction  
 For trouble-free retrofitting and applicable for repairs  
 Can be opened and closed again in longitudinal direction any time  
 Good ductility  
 Good compression resistance


### PACOF Index

min.	max.
Ductility	
Fatigue reversed bending	
Compression resistance	
Low temperature performance	
Weathering resistance	

Materials	Temperature range	Colour
Specially modified polyamide 6	-40°C to +105°C	Black
Certification	Fire performance	UV Resistance
Free from halogens, REACH compliant and RoHS compliant	Short-term to: +160°C	High (black)

Type PPCOF / PMA Divisible System - Flexible, divisible



	Order no. (black)	Conduit size NW	Inside Ø (mm)	Outside Ø (mm)	Stat. radius (mm)	PU (m)
	PPCOF-07B.50	07	5.6	10.0	25	50
	PPCOF-10B.50	10	8.5	12.8	28	50
	PPCOF-12B.50	12	11.0	15.6	35	50
	PPCOF-17B.50	17	15.1	21.1	45	50
	PPCOF-23B.50	23	22.1	28.4	60	50
	PPCOF-29B.50	29	26.6	34.5	100	50
	PPCOF-36B.30	36	31.8	42.4	120	30
	PPCOF-48B.30	48	43.9	54.1	140	30
	PPCOF-70B.10	70	60.5	78.0	200	10

For machine building and plant construction  
 For trouble-free retrofitting and applicable for repairs  
 Can be opened and closed again in longitudinal direction any time  
 Good reversed bending resistance

### PPCOF Index

min.	max.
Ductility	
Fatigue reversed bending	
Compression resistance	
Low temperature performance	
Weathering resistance	


Materials	Temperature range	Colour
Specially modified polypropylene PP	-20°C to +105°C	Black
Certification	Fire performance	UV Resistance
-	Short-term to +150°C	Medium (black)

## Stainless steel overbraided conduit

Type XPCS.../S stainless steel overbraiding for conduits



Type XPCS.../S / PMAFLEX Overbraided - Stainless steel overbraided conduit

	Order no. (black)	Conduit size NW	fits to metal fitting	braid spec (mm)	d1 Ø (mm)	d2 Ø (mm)	PU (m)
	XPCST-12BG/S.50	12	MONK-M162	24 x 8 x 0.30	*	17.5	50
	XPCST-17BG/S.50	17	MONK-M207	32 x 7 x 0.30	*	23.0	50
	XPCSG-23BG/S.50	23	MONK-M253	36 x 8 x 0.30	*	31.0	50
	XPCSG-29BG/S.50	29	MONK-M329	36 x 10 x 0.30	*	36.0	50
	XPCSG-36BG/S.50	36	MONK-M406	36 x 12 x 0.30	*	44.5	30
	XPCSG-48BG/S.50	48	MONK-M508	36 x 14 x 0.30	*	58.5	30

Our customer service or your local distribution partner will be pleased to help you concerning product availability and lead time

Application: in machine and railway construction; for high mechanical loads; in areas with hot swarf and flying sparks

Characteristics: increased mechanical conduit protection; extremely high abrasion resistance

Coverage: > 90%

Suitable for PMAFLEX, PMA Smart Line; Special metal fittings (MONK)

<b>Materials</b>	<b>Temperature range</b>	<b>Colour</b>
Braid made with stainless steel AISI	-70°C to +1000°C	Metal
<b>Certification</b>	<b>Fire performance</b>	<b>UV Resistance</b>
RoHS compliant	-	Very high

# PMAFIX Pro

## Introduction

Next generation cable protection. The extremely successful and technically proven PMAFIX System has been developed further to create the PMAFIX Pro product range.

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. PMAFIX Pro is manufactured by using multiple component injection moulding process.

### Key features

- Meets all ingress protection categories up to and including IP68 and IP69, also when the conduit connection is continually in motion
- Manufactured with newest 2-component injection moulding technology
- Fulfills highest international quality and standard requirements
- Intelligent safety locking mechanism
- Allows simple “push-in” installation of conduits
- Due to the integrated conduit supports, conduit remains centralised with little deformation even when bent sharply directly at the fitting







**PMAFIX Pro**

General technical details

—  
01 patent  
—  
02 Up to 100 bar

**Material**

- Fittings made from specially modified polyamide 6
- Threads made from nickel-plated brass or polyamide 6
- Sealings made from cross linked polyester elastomer
- Self-extinguishing
- Free from halogens, REACH + RoHS compliant
- Temperature range: -50°C to +105°C, short-term to +160°C

**Characteristics**

- Highest assembly reliability – the fitting only locks when the sealing element is fully inserted
- Highest operational safety assured through visual and acoustic correct assembly controls
- Excellent resistance to ultra violet rays and weathering
- Highest impact resistance through fully closed design
- Highest conduit pull out strength
- Vibration-proof connection to PMA conduits
- Fits conduit profiles – fine (T) and coarse (G)
- To avoid accidental opening, disassembling only possible with a screwdriver



—  
01



—  
02

IP68 + IP69

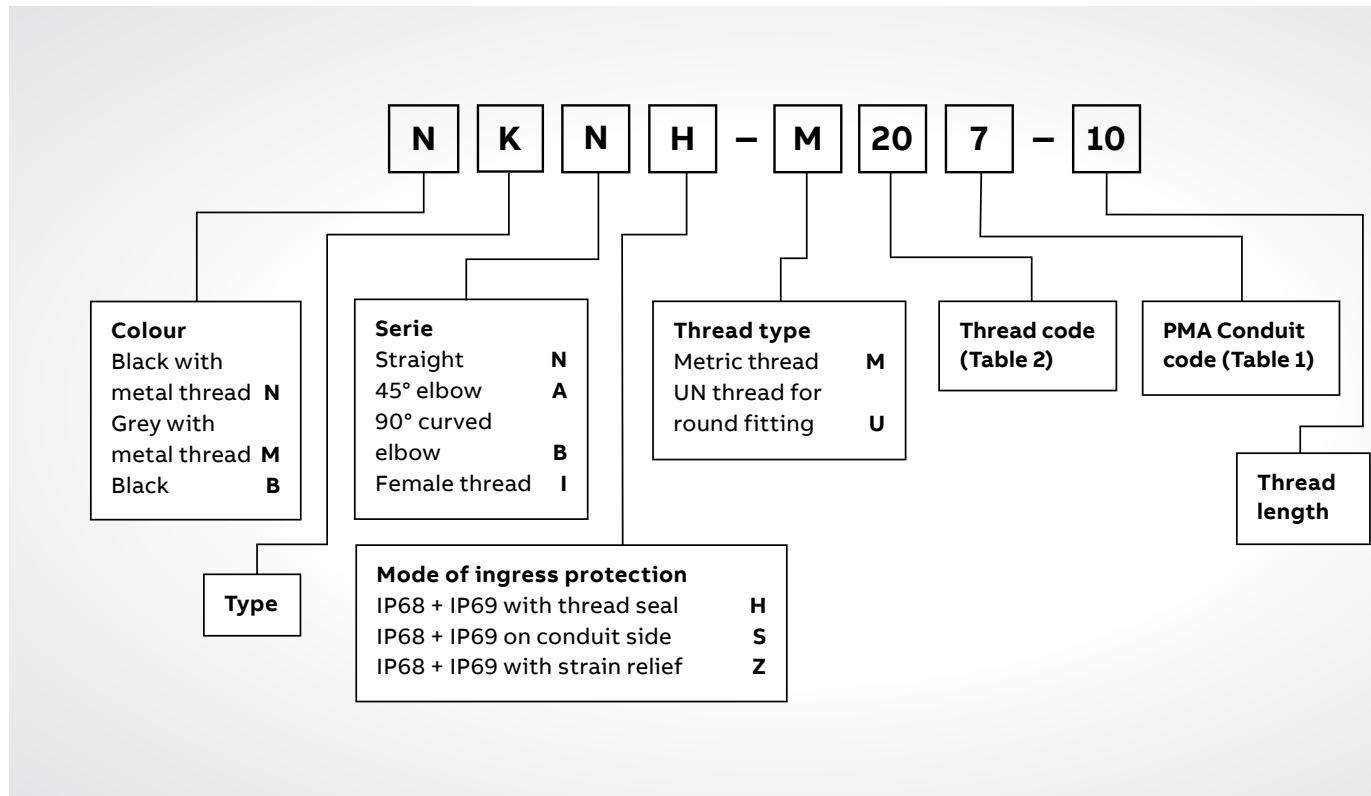
**Static + dynamic**

- Highest sealing through fully closed system also in highest dynamic applications
- Extra long ribbed sealing areas (cross linked material)
- 360° locking and sealing element shields against high pressure water jets (up to 100 bar)
- Content of delivery: Locking and sealing element and thread seal for male threads (O-Ring and/or flat gasket)

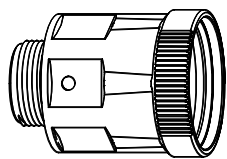


## PMAFIX Pro

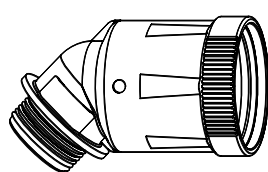
### Part number codes



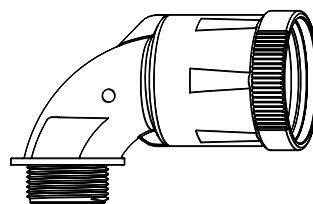
### IP68 + IP69 PMAFIX Pro fittings



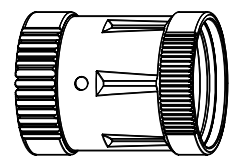
01



02



03



04

- 01 Straight (N)
- 02 45° elbow (A)
- 03 90° curved elbow (B)
- 04 Female thread (I)

# PMAFIX Pro

## Size codes, installation

Table 1: Conduit codes

Nominal width	Metric size	PMA code
10	12	0
12	16	2
17	20	7
23	25	3
29	32	9
36	40	6
48	50	8

Table 2: Thread codes

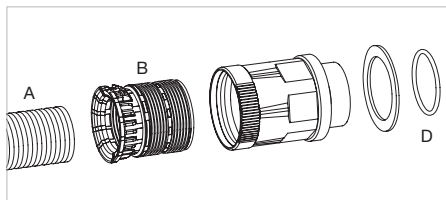
Thread Metric	PMA code
M12x1.5	M12
M16x1.5	M16
M20x1.5	M20
M25x1.5	M25
M32x1.5	M32
M40x1.5	M40
M50x1.5	M50
M63x1.5	M63

Thread UN	PMA code
7/8-20 UNEF	U21
1-20 UNEF	U24
1 3/16-18 UNEF	U29
1 7/16-18 UNEF	U35
1 3/4-18 UNS	U43
2-18 UNS	U50
2 1/4-16 UN	U56

### Additional code for female thread fittings

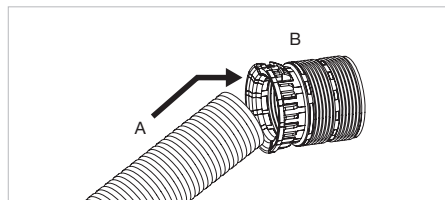
Type	PMA code
With O-ring groove (MIL C 5015)	G

## Installation IP68 + IP69



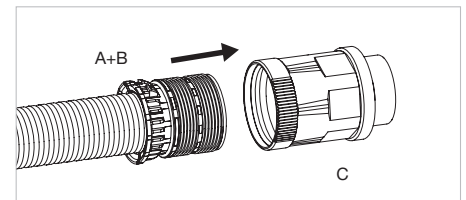
01

A = Corrugated conduit  
 B = Sealing and locking element  
 C = Fitting body  
 D = Thread seal (O-ring or flat gasket \*)



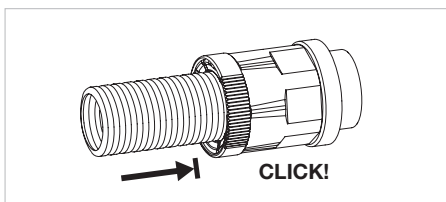
02

Place corrugated conduit (A) at a slight angle against the sealing element (B), then push right into the end.



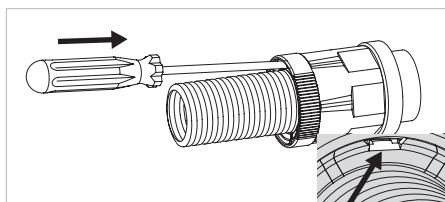
03

Push the conduit and sealing element (A+B) together into the outer body of the fitting (C). Water or a lubricating agent can help facilitate the push-in process.



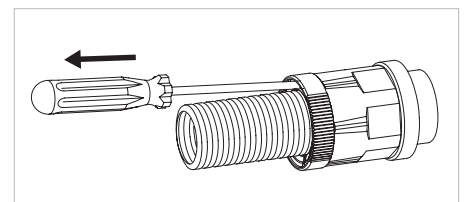
04

The locking mechanism engages when the sealing element is pushed in fully.



05

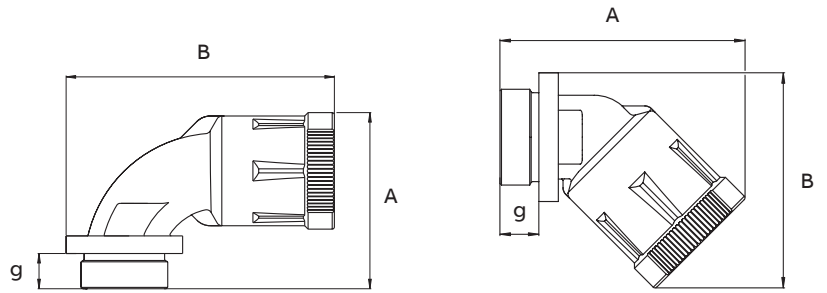
To disengage the locking mechanism introduce a size 1 screwdriver parallel to the conduit into the opening shown in the detail drawing.



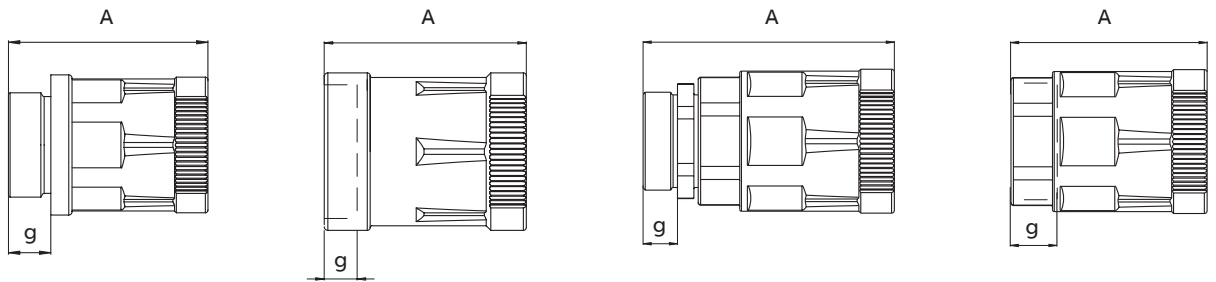
06

Pull the conduit and screwdriver out of the fitting together keeping the screwdriver parallel to the conduit.

Fitting dimensions



g = Thread length  
A x B = External dimensions



g = Thread length  
A = Overall length

**PMAFIX Pro**

Metric fittings, metal thread

Type KNH - Straight fitting, metric metal thread

	Order no. black IP68 + IP69	Thread metric	Fits to conduit size NW	Thread length (mm)	Overall length (mm)	PU (pcs)
	NKNH-M120-10	M12 x 1.5	10	10.0	45.0	50
	NKNH-M160-10	M16 x 1.5	10	10.0	45.0	50
	NKNH-M162-10	M16 x 1.5	12	10.0	50.5	50
	NKNH-M202-10	M20 x 1.5	12	10.0	50.5	50
	NKNH-M207-10	M20 x 1.5	17	10.0	56.0	50
	NKNH-M257-11	M25 x 1.5	17	11.0	57.0	50
	NKNH-M253-11	M25 x 1.5	23	11.0	59.5	30
	NKNH-M323-13	M32 x 1.5	23	13.0	61.5	30
	NKNH-M329-13	M32 x 1.5	29	13.0	67.0	20
	NKNH-M409-13	M40 x 1.5	29	13.0	68.5	20
	NKNH-M406-13	M40 x 1.5	36	13.0	74.0	20
	NKNH-M506-14	M50 x 1.5	36	14.0	75.0	20
	NKNH-M508-14	M50 x 1.5	48	14.0	81.0	10
	NKNH-M638-14	M63 x 1.5	48	14.0	81.0	10

Approvals



For applications in railway vehicles and heavy machine construction  
High thread and system connection strength

# Metric fittings, metal thread

## Type KNZ

Type KNZ - Straight fitting with strain relief, metric metal thread



	Order no. IP68 + IP69 Compl., black	Order no. fitting*	Order no. insert	Thread metric	Fits to conduit size NW	Terminal range (mm)	Thread length (mm)	Overall length (mm)	PU (pcs)	
	KNZ, patent	NKNZ-M120/P1	NKNZ-M120R/P	EK150p7	M12 x 1.5	10	4.0–6.5	5.0	53.5	50
		NKNZ-M120/P2		EK150p8	M12 x 1.5	10	5.0–8.0	5.0	53.5	50
		NKNZ-M120/P3		EK150p9	M12 x 1.5	10	6.5–9.5	5.0	53.5	50
		NKNZ-M160/P1	NKNZ-M160R/P	E150p7	M16 x 1.5	10	4.0–6.5	6.0	54.5	50
		NKNZ-M160/P2		E150p8	M16 x 1.5	10	5.0–8.0	6.0	54.5	50
		NKNZ-M160/P3		E150p9	M16 x 1.5	10	6.5–9.5	6.0	54.5	50
		NKNZ-M202/P1	NKNZ-M202R/P	E152p7	M20 x 1.5	12	4.0–6.5	6.5	60.5	50
		NKNZ-M202/P3		E152p9	M20 x 1.5	12	6.5–9.5	6.5	60.5	50
		NKNZ-M202/P4		E152p11	M20 x 1.5	12	7.0–10.5	6.5	60.5	50
		NKNZ-M207/P3	NKNZ-M207R/P	E152p9	M20 x 1.5	17	6.5–9.5	6.5	66.5	50
	NKNZ-M207/P4		E152p11	M20 x 1.5	17	7.0–10.5	6.5	66.5	50	
	NKNZ-M207/P5		E152p13	M20 x 1.5	17	9.0–13.0	6.5	66.5	50	
	NKNZ-M257/P4	NKNZ-M257R/P	E153p11	M25 x 1.5	17	7.0–10.5	7.5	67.5	50	
	NKNZ-M257/P5		E153p13	M25 x 1.5	17	9.0–13.0	7.5	67.5	50	
	NKNZ-M257/P6		E153p16	M25 x 1.5	17	11.5–15.5	7.5	67.5	50	
	NKNZ-M253/P5	NKNZ-M253R/P	EK154p13	M25 x 1.5	23	9.0–13.0	7.5	75.0	30	
	NKNZ-M253/P6	NKNZ-M253R1/P	EK154p16	M25 x 1.5	23	11.5–15.5	7.5	75.0	30	
	NKNZ-M323/P2	NKNZ-M323R/P	E154p13	M32 x 1.5	23	9.0–13.0	8.0	76.0	30	
	NKNZ-M323/P4		E154p18	M32 x 1.5	23	14.0–18.0	8.0	76.0	30	
	NKNZ-M323/P5	NKNZ-M323R1/P	E154p20	M32 x 1.5	23	17.0–20.5	8.0	76.0	30	
	NKNZ-M329/P2	NKNZ-M329R/P	EK155p18	M32 x 1.5	29	14.0–18.0	8.0	83.0	20	
	NKNZ-M329/P3		EK155p20	M32 x 1.5	29	17.0–20.5	8.0	83.0	20	
	NKNZ-M329/P4		EK155p25	M32 x 1.5	29	20.0–25.0	8.0	83.0	20	
	NKNZ-M409/P1	NKNZ-M409R/P	E155p16	M40 x 1.5	29	11.5–15.5	8.0	83.0	20	
	NKNZ-M409/P2		E155p18	M40 x 1.5	29	14.0–18.0	8.0	83.0	20	
	NKNZ-M409/P3		E155p20	M40 x 1.5	29	17.0–20.5	8.0	83.0	20	
	NKNZ-M409/P4		E155p25	M40 x 1.5	29	20.0–25.0	8.0	83.0	20	
	NKNZ-M409/P5		E155p28	M40 x 1.5	29	24.0–28.0	8.0	83.0	20	
	NKNZ-M406/P1	NKNZ-M406R/P	E156p25HF	M40 x 1.5	36	20.0–25.0	9.0	87.5	20	
	NKNZ-M406/P2		EK156p28	M40 x 1.5	36	24.0–28.0	9.0	87.5	20	
	NKNZ-M506/P1	NKNZ-M506R/P	E156p32	M50 x 1.5	36	27.0–32.0	10.0	90.0	20	
	NKNZ-M506/P3		E156p36	M50 x 1.5	36	32.0–36.0	10.0	90.0	20	
	NKNZ-M508/P2	NKNZ-M508R/P	E157p36HF	M50 x 1.5	48	32.0–36.0	10.0	100.0	10	
	NKNZ-M508/P3		E157p40HF	M50 x 1.5	48	36.0–40.0	10.0	100.0	10	
	NKNZ-M638/P1	NKNZ-M638R/P	E158pm1x35	M63 x 1.5	48	32.0–35.0	10.0	100.0	10	
	NKNZ-M638/P2		E158p44	M63 x 1.5	48	39.0–44.0	10.0	100.0	10	

c RU US

**Approvals**




\* without insert  
 For applications in railway vehicles and heavy machine construction  
 For the separation of damp and dry areas  
 Sealing inserts are made from TPE-V  
 With integrated strain relief and optimal ingress protection at the cable (up to IP68/10 bar)  
 High thread and system connection strength  
 Temperature range sealing insert Pflitsch: -40°C to +135°C  
**Note:** For several conductors multiple sealing inserts MDE are available. R/P version of fitting has to be used in combination with multiple sealing inserts

## Metric fittings, metal thread

### Type KNZ

Type KNZ - Straight fitting with strain relief, metric long metal thread



	Order no. IP68 + IP69 Compl., black	Order no. fitting*	Order no. insert	Thread metric	Fits to conduit size NW	Terminal range (mm)	Thread length (mm)	Overall length (mm)	PU (pcs)	
	KNZ, patent	NKNZ-M160/P1-L	NKNZ-M160R/P-L	E150p7	M16 x 1.5	10	4.0–6.5	15.0	63.5	50
		NKNZ-M160/P2-L		E150p8	M16 x 1.5	10	5.0–8.0	15.0	63.5	50
		NKNZ-M160/P3-L		E150p9	M16 x 1.5	10	6.5–9.5	15.0	63.5	50
		NKNZ-M202/P1-L	NKNZ-M202R/P-L	E152p7	M20 x 1.5	12	4.0–6.5	15.0	69.0	50
		NKNZ-M202/P3-L		E152p9	M20 x 1.5	12	6.5–9.5	15.0	69.0	50
		NKNZ-M202/P4-L		E152p11	M20 x 1.5	12	7.0–10.5	15.0	69.0	50
		NKNZ-M207/P3-L	NKNZ-M207R/P-L	E152p9	M20 x 1.5	17	6.5–9.5	15.0	75.0	50
		NKNZ-M207/P4-L		E152p11	M20 x 1.5	17	7.0–10.5	15.0	75.0	50
		NKNZ-M207/P5-L		E152p13	M20 x 1.5	17	9.0–13.0	15.0	75.0	50
		NKNZ-M257/P5-L	NKNZ-M257R/P-L	E153p13	M25 x 1.5	17	9.0–13.0	15.0	75.0	50
		NKNZ-M257/P6-L		E153p16	M25 x 1.5	17	11.5–15.5	15.0	75.0	50
		NKNZ-M323/P2-L	NKNZ-M323R/P-L	E154p13	M32 x 1.5	23	9.0–13.0	15.0	83.0	30
		NKNZ-M323/P4-L		E154p18	M32 x 1.5	23	14.0–18.0	15.0	83.0	30
		NKNZ-M323/P5-L	NKNZ-M323R1/P-L	E154p20	M32 x 1.5	23	17.0–20.5	15.0	83.0	30
		NKNZ-M329/P2-L	NKNZ-M329R/P-L	EK155p18	M32 x 1.5	29	14.0–18.0	15.0	90.0	20
		NKNZ-M329/P3-L		EK155p20	M32 x 1.5	29	17.0–20.5	15.0	90.0	20
		NKNZ-M409/P3-L	NKNZ-M409R/P-L	E155p20	M40 x 1.5	29	17.0–20.5	15.0	90.0	20
		NKNZ-M409/P4-L		E155p25	M40 x 1.5	29	20.0–25.0	15.0	90.0	20
		NKNZ-M409/P5-L		E155p28	M40 x 1.5	29	24.0–28.0	15.0	90.0	20
		NKNZ-M506/P1-L	NKNZ-M506R/P-L	E156p32	M50 x 1.5	36	27.0–32.0	15.0	95.0	20
	NKNZ-M506/P3-L		E156p36	M50 x 1.5	36	32.0–36.0	15.0	95.0	20	
	NKNZ-M508/P2-L	NKNZ-M508R/P-L	E157p36HF	M50 x 1.5	48	32.0–36.0	15.0	105.0	10	
	NKNZ-M508/P3-L		E157p40HF	M50 x 1.5	48	36.0–40.0	15.0	105.0	10	
	NKNZ-M638/P1-L	NKNZ-M638R/P-L	E158pm1x35	M63 x 1.5	48	32.0–35.0	15.0	105.0	10	
	NKNZ-M638/P2-L		E158p44	M63 x 1.5	48	39.0–44.0	15.0	105.0	10	

\* without insert

For applications in railway vehicles and heavy machine construction

For the separation of damp and dry areas

Sealing inserts are made from TPE-V

With integrated strain relief and optimal ingress protection at the cable (up to IP68/10 bar)

High thread and system connection strength

Temperature range sealing insert Pflitsch: -40°C to +135°C

**Note:** For several conductors multiple sealing inserts MDE are available. R/P version of fitting has to be used in combination with multiple sealing inserts


#### Approvals



## Metric fittings, metal thread

### Type KNZ

Type KNZ - Straight fitting with strain relief, metric metal thread

	Order no. IP68 + IP69 Compl., black	Thread metric	Fits to conduit size NW	Terminal range (mm)	Thread length (mm)	Overall length (mm)	PU (pcs)
	NKNZ-M160S-5	M16 x 1.5	10	5.0–9.0	5.0	59.0	50
	NKNZ-M162S-5	M16 x 1.5	12	5.0–9.0	5.0	64.5	50
	NKNZ-M202S-10	M20 x 1.5	12	9.0–13.0	10.0	72.0	50
	NKNZ-M202S-6	M20 x 1.5	12	9.0–13.0	6.0	68.0	50
	NKNZ-M207S-10	M20 x 1.5	17	9.0–13.0	10.0	77.5	50
	NKNZ-M207S-6	M20 x 1.5	17	9.0–13.0	6.0	73.5	50
	NKNZ-M257S-11	M25 x 1.5	17	11.0–16.0	11.0	79.0	50
	NKNZ-M257S-7	M25 x 1.5	17	11.0–16.0	7.0	75.0	50
	NKNZ-M253S-11	M25 x 1.5	23	11.0–16.0	11.0	81.0	30
	NKNZ-M253S-7	M25 x 1.5	23	11.0–16.0	7.0	77.0	30
	NKNZ-M323S-13	M32 x 1.5	23	14.0–21.0	13.0	90.0	30
	NKNZ-M323S-8	M32 x 1.5	23	14.0–21.0	8.0	85.0	30
	NKNZ-M329S-13	M32 x 1.5	29	14.0–21.0	13.0	94.5	20
	NKNZ-M329S-8	M32 x 1.5	29	14.0–21.0	8.0	89.5	20
	NKNZ-M409S-13	M40 x 1.5	29	19.0–27.0	13.0	95.5	20
	NKNZ-M409S-8	M40 x 1.5	29	19.0–27.0	8.0	90.5	20
	NKNZ-M406S-13	M40 x 1.5	36	19.0–27.0	13.0	100.0	20
	NKNZ-M406S-8	M40 x 1.5	36	19.0–27.0	8.0	95.0	20
	NKNZ-M506S-14	M50 x 1.5	36	24.0–35.0	14.0	108.5	20
	NKNZ-M506S-9	M50 x 1.5	36	24.0–35.0	9.0	103.5	20
NKNZ-M508S-14	M50 x 1.5	48	24.0–35.0	14.0	114.5	10	
NKNZ-M508S-9	M50 x 1.5	48	24.0–35.0	9.0	109.5	10	
NKNZ-M638S-14	M63 x 1.5	48	32.0–42.0	14.0	116.0	10	
NKNZ-M638S-10	M63 x 1.5	48	32.0–42.0	10.0	112.0	10	

#### Approvals





For applications in railway vehicles and heavy machine construction  
 For the separation of damp and dry areas  
 Very high impact resistance  
 With integrated strain relief for optimal ingress protection at the cable (up to IP68 / 5 bar)  
 High thread and system connection strength  
 Vibration-resistant connection to PMA conduits  
 Easy push-in assembly for maximum installation reliability  
 Screwdriver required for dismantling, impeding unauthorised or accidental opening  
 Space-saving dismantling  
 Excellent conduit pull-out strength



## Metric fittings, metal thread



### Type KAH & KBH

#### Type KAH - 45° elbow fitting, metric metal thread

	Order no. black IP68 + IP69	Thread metric	Fits to conduit size NW	Thread length (mm)	External dimensions (mm)	PU (pcs)
KAH, patent 	NKAH-M120-10	M12 x 1.5	10	10.0	55.5 x 43.0	50
	NKAH-M160-10	M16 x 1.5	10	10.0	55.5 x 45.0	50
	NKAH-M162-10	M16 x 1.5	12	10.0	62.5 x 50.0	50
	NKAH-M202-10	M20 x 1.5	12	10.0	62.5 x 52.0	50
	NKAH-M207-10	M20 x 1.5	17	10.0	71.0 x 59.5	50
	NKAH-M257-11	M25 x 1.5	17	11.0	72.0 x 62.5	50
	NKAH-M253-11	M25 x 1.5	23	11.0	80.0 x 68.0	30
	NKAH-M323-13	M32 x 1.5	23	13.0	82.0 x 72.0	30
	NKAH-M329-13	M32 x 1.5	29	13.0	93.0 x 79.5	20
	NKAH-M409-13	M40 x 1.5	29	13.0	94.5 x 85.5	20
<b>Approvals</b>	NKAH-M406-13	M40 x 1.5	36	13.0	105.5 x 93.5	20
	NKAH-M506-14	M50 x 1.5	36	14.0	106.5 x 98.5	20
	NKAH-M508-14	M50 x 1.5	48	14.0	120.0 x 111.0	10
	NKAH-M638-14	M63 x 1.5	48	14.0	120.0 x 114.0	10

For applications in railway vehicles and heavy machine construction  
High thread and system connection strength

#### Type KBH - 90° curved elbow fitting, metric metal thread



	Order no. black IP68 + IP69	Thread metric	Fits to conduit size NW	Thread length (mm)	External dimensions (mm)	PU (pcs)
KBH, patent 	NKBH-M120-10	M12 x 1.5	10	10.0	44.0 x 62.5	50
	NKBH-M160-10	M16 x 1.5	10	10.0	44.0 x 64.5	50
	NKBH-M162-10	M16 x 1.5	12	10.0	47.5 x 72.0	50
	NKBH-M202-10	M20 x 1.5	12	10.0	47.5 x 74.0	50
	NKBH-M207-10	M20 x 1.5	17	10.0	53.0 x 81.0	50
	NKBH-M257-11	M25 x 1.5	17	11.0	54.0 x 84.0	50
	NKBH-M253-11	M25 x 1.5	23	11.0	63.0 x 92.0	30
	NKBH-M323-13	M32 x 1.5	23	13.0	65.0 x 96.0	30
	NKBH-M329-13	M32 x 1.5	29	13.0	75.0 x 108.0	20
	NKBH-M409-13	M40 x 1.5	29	13.0	76.5 x 114.0	20
<b>Approvals</b>	NKBH-M406-13	M40 x 1.5	36	13.0	87.5 x 126.0	20
	NKBH-M506-14	M50 x 1.5	36	14.0	88.5 x 131.0	20
	NKBH-M508-14	M50 x 1.5	48	14.0	101.0 x 145.5	10
	NKBH-M638-14	M63 x 1.5	48	14.0	101.0 x 148.5	10

For applications in railway vehicles and heavy machine construction  
High thread and system connection strength  
Smooth elbow allows easy threading of wires and cables

## UNEF fittings, female polyamide thread

### Type KIHG

Type KIHG - Straight fitting, UN female polyamide thread for MIL-C5015


	Order no. black IP68 + IP69	Thread UN	Shell size MIL	Fits to conduit size NW	Thread length (mm)	Overall length (mm)	PU (pcs)	
KIHG, patent  	BKIHG-U212	7/8"-20 UNEF	16	12	9.0	47.0	50	
	BKIHG-U217	7/8"-20 UNEF	16	17	9.0	52.5	50	
	BKIHG-U242	1"-20 UNEF	18	12	9.0	47.0	50	
	BKIHG-U247	1"-20 UNEF	18	17	9.0	52.5	30	
	BKIHG-U243	1"-20 UNEF	18	23	9.0	55.5	50	
	BKIHG-U292	1 3/16"-18 UNEF	20	12	9.0	50.5	50	
	BKIHG-U297	1 3/16"-18 UNEF	20	17	9.0	52.5	30	
	BKIHG-U293	1 3/16"-18 UNEF	20	23	9.0	55.5	50	
	BKIHG-U299	1 3/16"-18 UNEF	20	29	9.0	61.0	20	
	BKIHG-U357	1 7/16"-18 UNEF	24	17	9.0	58.0	30	
	BKIHG-U353	1 7/16"-18 UNEF	24	23	9.0	55.5	50	
	BKIHG-U359	1 7/16"-18 UNEF	24	29	9.0	61.0	20	
	BKIHG-U433	1 3/4"-18 UNS	32	23	10.0	62.5	30	
	BKIHG-U439	1 3/4"-18 UNS	32	29	10.0	62.0	20	
	BKIHG-U503	2"-18 UNS	36	23	10.0	67.0	30	
	BKIHG-U509	2"-18 UNS	36	29	10.0	67.5	20	
	<b>Approvals</b>	BKIHG-U506	2"-18 UNS	36	36	10.0	67.0	10
		BKIHG-U508	2"-18 UNS	36	48	10.0	73.5	20
		BKIHG-U566	2 1/4"-16 UN	40	36	10.0	72.0	20
		BKIHG-U568	2 1/4"-16 UN	40	48	10.0	73.5	10

For applications in railway vehicles and heavy machine construction  
Suitable for MIL fittings, series C5015

## Metric fittings, female metal thread

### Type KIS

#### Type KIS - Straight fitting, metric metal female thread

	Order no. black IP68 + IP69	Thread metric	Fits to conduit size NW	Thread length (mm)	Overall length (mm)	PU (pcs)
	NKIS-M162	M16 x 1.5	12	9.0	49.0	50
	NKIS-M207	M20 x 1.5	17	10.5	56.0	50
	NKIS-M253	M25 x 1.5	23	10.5	58.5	30
	NKIS-M329	M32 x 1.5	29	11.0	65.5	20
	NKIS-M406	M40 x 1.5	36	13.5	72.0	20
	NKIS-M508	M50 x 1.5	48	15.0	83.0	10
	NKIS-M638	M63 x 1.5	48	17.5	84.0	10

#### Approvals



For applications in railway vehicles and heavy machine construction  
 High thread and system connection strength  
 No seal on female thread side

# PMAFIX IP66, IP68 (IP69)

## General technical details

PMAFIX IP66, IP68 (IP69) fittings. The designation PMAFIX describes a very large range of fittings for PMA conduits with the patented PMA safety clip system.

Fittings are available for degrees of ingress protection IP66 and IP68 according to IEC 60529. IP66 fittings are fitted with a pre-installed universal safety clip which ensures a quick “push-in” installation. IP68 fittings for increased requirements will be delivered with a special conduit seal cap. The new PMAFIX IP68GT fittings combine simplest push-in assembly with highest sealing performance. It is also possible to upgrade to IP69 by retrofitting water impact protection.

### Material

- Fittings made from specially formulated polyamide 6
- Threads made from nickel-plated brass or polyamide 6
- Self-extinguishing
- Free from halogens, REACH + RoHS compliant
- Very good chemical properties
- Temperature range: -40°C to +105°C, short-term to +160°C

### Characteristics

- Excellent conduit pull-out strength
- High impact resistance
- Vibration-proof connection to PMA corrugated conduits
- Fits conduit profiles – fine (T) and coarse (G)
- To avoid accidental opening, disassembly is only possible with a screwdriver





## PMAFIX

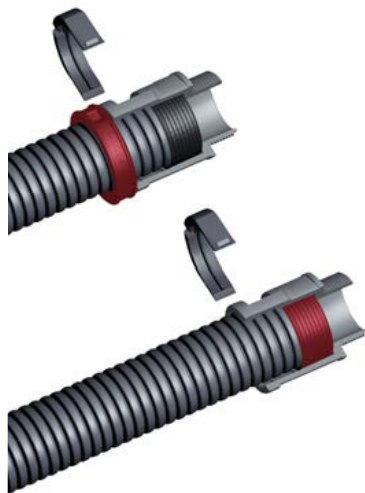
### General technical details



—  
Patent



—  
Patent



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Patent

### IP66

#### IP66 static

#### IP54 dynamic

- One piece fitting
- Conical sealing method
- Easy “push-in” installation
- Pre-installed safety clip AFN2
- Content of delivery: Fitting with pre-installed safety clip

### IP68GT

#### IP68, IP69 static

#### IP67, IP69 dynamic

- The single piece PMAFIX IP68GT fitting with integrated sealing cap and pre-installed locking clip
- Simple push-in assembly (as with the proven PMAFIX IP66 system)
- The extra long sealing cap guarantees the highest level of ingress protection
- Identical approvals as for the PMAFIX IP68 system component version
- Fast modification of specification drawings through simple addition of “GT” to the existing order number (e.g. BVNV-M257 → BVNV-M257GT)
- Additional water protection ring WPS for IP69 ingress protection in conjunction with the IP68 system to be applied right after the IP68 fitting onto the conduit
- Content of delivery: Fitting with integrated sealing cap, pre-installed safety clip and thread seal for male thread (O-ring and/or flat gasket)

### IP68

#### IP68, IP69 static

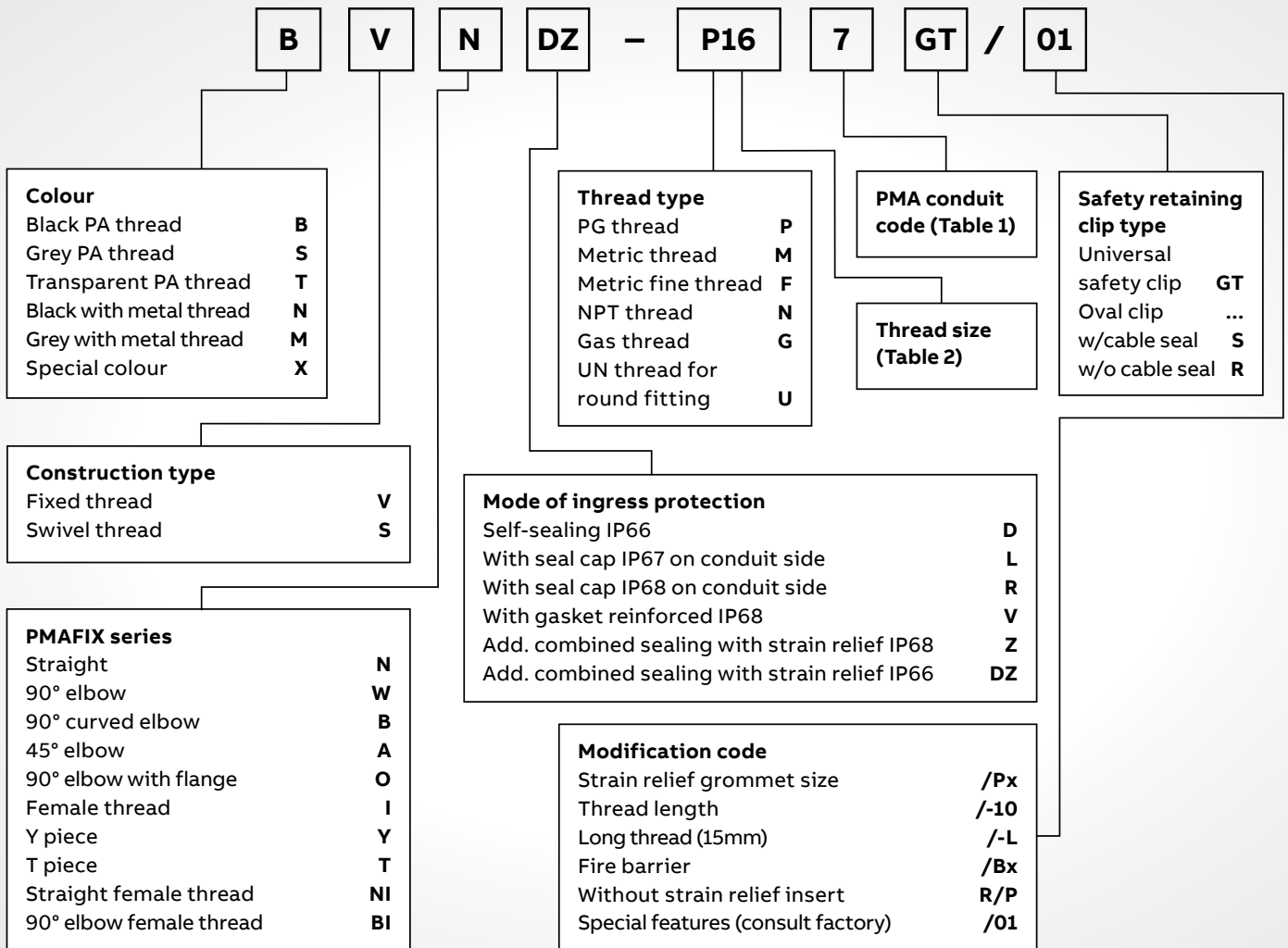
#### IP67, IP69 dynamic

- High sealing through additional seal cap
- For highest dynamic applications
- Additional water protection ring WPS for IP69 ingress protection in conjunction with the IP68 system to be applied right after the IP68 fitting onto the conduit
- Content of delivery: Fitting with sealing cap, safety clip and thread seal for male thread (O-ring and/or flat gasket)

# PMAFIX fittings

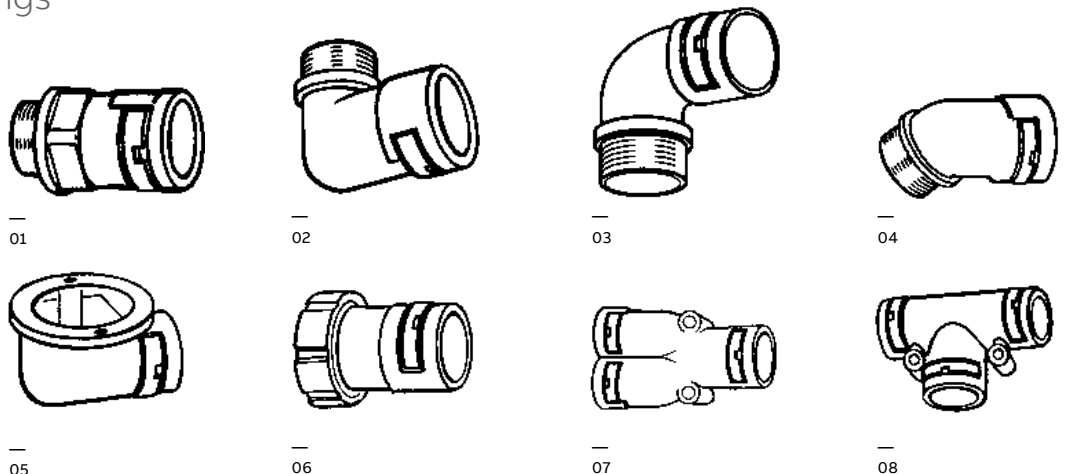
## Part number codes

For part number explanation only, not to be used as a configuration tool.



## PMAFIX series fittings

- 01 Serie N
- 02 Serie W
- 03 Serie B
- 04 Serie A
- 05 Serie O
- 06 Serie I
- 07 Serie Y
- 08 Serie T



## PMAFIX

### Size codes

Table 1: Conduit codes

Nominal width	Metric size	PMA code
07	10	M
10	12	0
12	16	2
17	20	7
23	25	3
29	32	9
36	40	6
48	50	8

Additional code for female thread fittings

Type	PMA code
AMP	A
Souriau (ex Burndy) UTG 6	B
With O-ring groove (MIL C 5015)	G
Souriau UTO/UTS	S

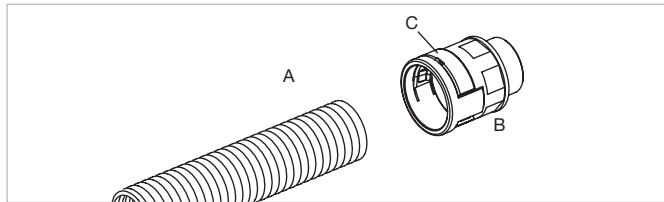
Table 2: Thread codes

Thread metric	PMA code	Thread PG	PMA code	Thread Gas	PMA code	Thread NPT	PMA code	Thread UN	PMA code
		PG07	P07	G ¼	G00				
M12 x 1.5	M12	PG09	P09	G ⅜	G01				
M16 x 1.5	M16	PG11	P11	G ½	G02	N ½	N02	½-28 UNEF	U12
M20 x 1.5	M20	PG13.5	P13	G ¾	G04	N ¾	N04	9/16-24 UNEF	U13
		PG16	P16	G 1	G06	N 1	N06	5/8-24 UNEF	U15
M25 x 1.5	M25	PG21	P21	G 1¼	G07	N 1¼	N07	11/16-24 UNEF	U16
M32 x 1.5	M32	PG29	P29	G 1½	G08	N 1½	N08	¾-20 UNEF	U18
M40 x 1.5	M40	PG36	P36	G 2	G09	N 2	N09	13/16-20 UNEF	U20
M50 x 1.5	M50	PG42	P42	G 2¼	G10			7/8-20 UNEF	U21
M63 x 1.5	M63	PG48	P48	G 2½	G11			15/16-20 UNEF	U23
								1-20 UNEF	U24
								1¼-18 UNEF	U26
M 8 x 1.0	F08							3/16-18 UNEF	U29
M12 x 1.0	F12							1/4-18 UNEF	U30
M18 x 1.0	F18							5/16-18 UNEF	U32
								3/8-18 UNEF	U34
								17/16-18 UNEF	U35
								15/8-18 UNEF	U40
								1¾-18 UNS	U43
								2-18 UNS	U50
								2¼-16 UN	U56
								23/8-12 UN	U57
								2½-12 UN	U62

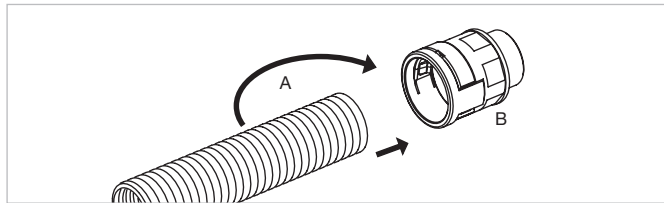


**PMAFIX**  
Installation

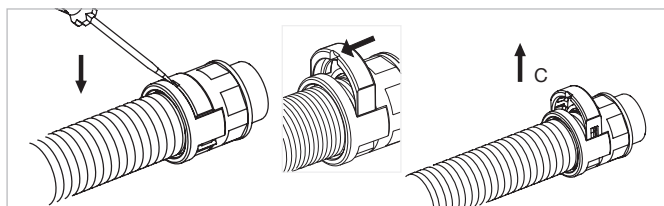
Installation IP66



01  
A = Conduit  
B = Fitting  
C = Universal safety clip



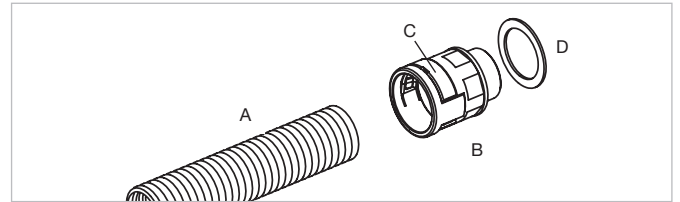
02  
Push in the conduit (A) with a slight twist until the stop.



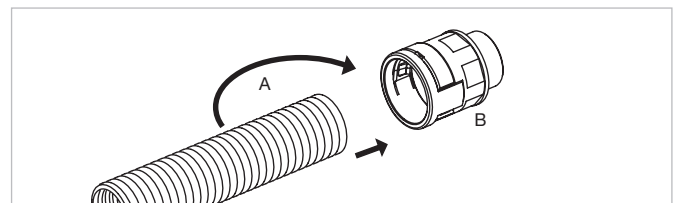
03  
To re-open use a screwdriver.  
The screwdriver slot in the oval clip (C) should be on the conduit side.

Locking clip pre-installed in all IP66 fittings.

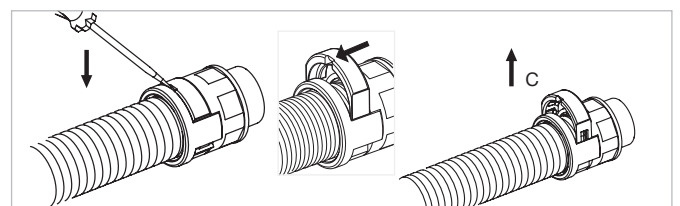
Installation IP68GT



01  
A = Conduit  
B = Fitting with integrated sealing cap  
C = Universal safety clip  
D = Thread seal (either O-ring or flat gasket\*, not both)



02  
Push in the conduit (A) right into the end of the fitting (B) with a slight twist. Additional insertion resistance will be felt when the end of the fitting has been reached.



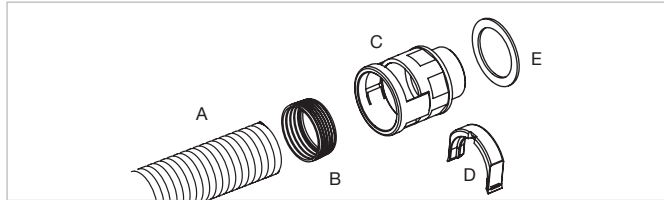
03  
To re-open use a screwdriver.  
The screwdriver slot in the oval clip (C) should be on the conduit side.

Pre-installed sealing cap and locking clip in all IP68GT fittings.

\* Ensure to follow O-ring manufacturers guidelines when using O-rings for sealing purposes.

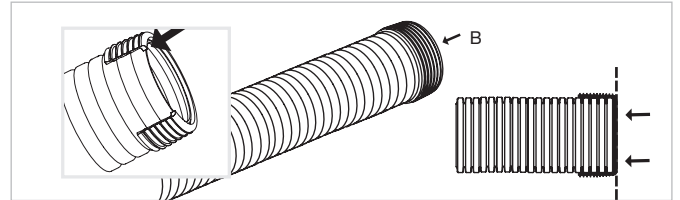
**PMAFIX**  
Installation

Installation IP68 (IP69)



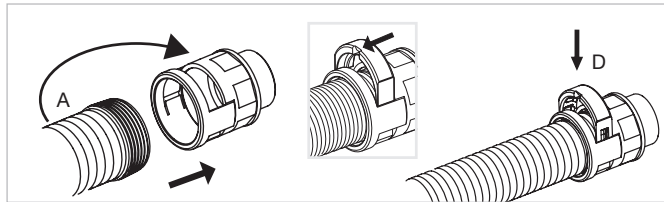
01

- A = Conduit
- B = Sealing cap
- C = Fitting
- D = Oval clip
- E = Thread seal (O-ring or flat seal\*)



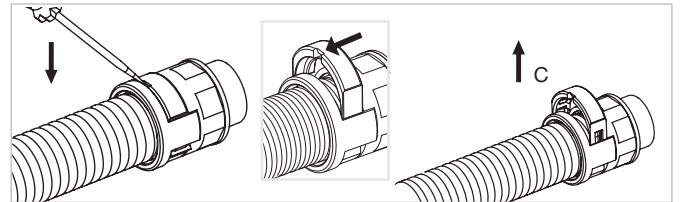
02

Push sealing cap (B) completely onto the conduit in order to achieve IP68.



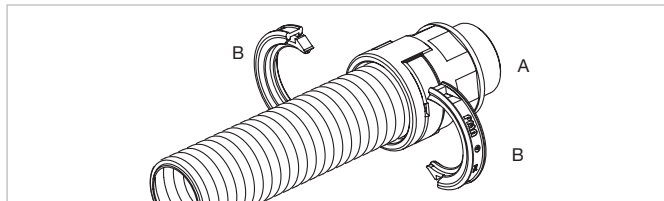
03

Push in the conduit (A) with a slight twist until the stop. Insert oval clip (D) in the locking element window and click into place. Screwdriver slot in the oval clip should be on conduit side.



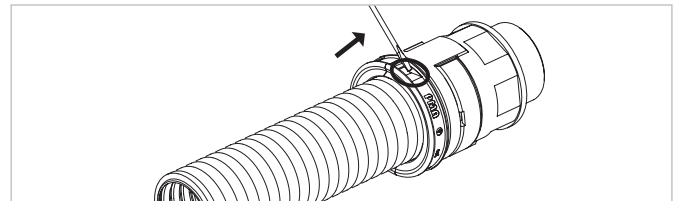
04

To re-open use a screwdriver.



05

- For IP69:
- Based on IP68 System
- A = Conduit with IP68 fitting
- B = WPS half shells



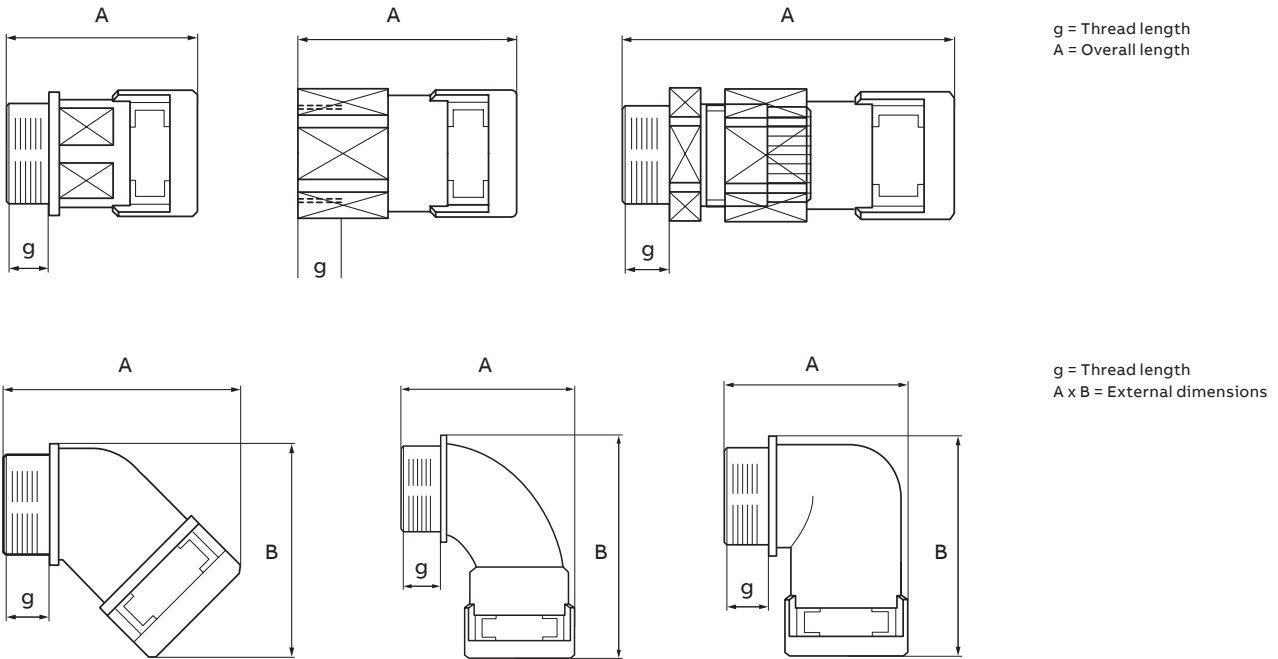
06

To re-open use a screwdriver.

\* For safety reasons, oval clip will not fit if seal cap is not fully installed.

Ensure to follow O-ring manufacturers guidelines when using O-rings for sealing purposes.

## Fitting dimensions



## Metric fittings, polyamide thread

### Type VN

#### Type VN - Straight fitting, metric thread

	Order no. IP66 ①	Order no. IP68* ① ②	Thread metric	Fits to conduit size NW	Thread length (mm)	Overall length (mm)	PU (pcs)
	BVND-M12MGT	BVNV-M12M	M12 x 1.5	07	11.0	34.5	100
	BVND-M120GT	BVNV-M120	M12 x 1.5	10	11.0	36.5	100
	BVND-M160GT	BVNV-M160	M16 x 1.5	10	11.0	36.5	100
	BVND-M162GT	BVNV-M162	M16 x 1.5	12	11.0	39.5	100
	BVND-M200GT	BVNV-M200	M20 x 1.5	10	11.0	36.5	100
	BVND-M202GT	BVNV-M202	M20 x 1.5	12	11.0	39.5	100
	BVND-M207GT	BVNV-M207	M20 x 1.5	17	11.0	47.5	100
	BVND-M203GT	BVNV-M203	M20 x 1.5	23	11.0	51.0	50
	BVND-M257GT	BVNV-M257	M25 x 1.5	17	12.0	48.5	100
	BVND-M253GT	BVNV-M253	M25 x 1.5	23	12.0	52.0	50
	BVND-M323GT	BVNV-M323	M32 x 1.5	23	15.0	55.5	50
	BVND-M329GT	BVNV-M329	M32 x 1.5	29	15.0	56.0	30
	BVND-M409GT	BVNV-M409	M40 x 1.5	29	19.0	60.0	30
	BVND-M406GT	BVNV-M406	M40 x 1.5	36	19.0	72.5	20
	BVND-M506GT	BVNV-M506	M50 x 1.5	36	19.0	72.0	20
	BVND-M508GT	BVNV-M508	M50 x 1.5	48	19.0	72.5	10
	BVND-M638GT	BVNV-M638	M63 x 1.5	48	19.0	72.0	10

#### Approvals




For cable protection systems in a wide range of applications

- ① Please replace "B" for black with "S" for grey in front of the order no.
- ② IP68GT available. Please add "GT" after the order no.

## Metric UL fittings, polyamide thread

### Type UNV-M-UL

#### Type UNV - Straight fitting, metric thread

	Order no. black	Thread metric	Fits to conduit size NW	Thread length (mm)	Overall length (mm)	PU (pcs)
	BUNV-M207-UL	M20 x 1.5	17	11.0	47.5	50
	BUNV-M257-UL	M25 x 1.5	17	12.0	48.5	50
	BUNV-M253-UL	M25 x 1.5	23	12.0	52.0	30
	BUNV-M323-UL	M32 x 1.5	23	15.0	55.5	30
	BUNV-M329-UL	M32 x 1.5	29	15.0	56.0	20
	BUNV-M409-UL	M40 x 1.5	29	19.0	60.0	20
	BUNV-M406-UL	M40 x 1.5	36	19.0	72.5	20
	BUNV-M506-UL	M50 x 1.5	36	19.0	72.0	20
	BUNV-M508-UL	M50 x 1.5	48	19.0	72.5	10
	BUNV-M638-UL	M63 x 1.5	48	19.0	72.0	10

#### Approvals




Extremely high impact resistance  
 Vibration-resistant connection to PMA FLEXPlus conduits  
 Easy installation  
 High conduit pull-out strength  
 Very good chemical properties  
 Free from halogens and cadmium  
 Fits conduit profile coarse (G)  
 Lock nut delivered with the fitting

## Metric fittings, metal thread

### Type VNV

#### Type VNV - Straight fitting, metric metal thread

	Order no. IP68, black <sup>1</sup>	Order no. IP68, grey <sup>1</sup>	Thread metric	Fits to conduit size NW	Thread length (mm)	Overall length (mm)	PU (pcs)	
	NVNV-M120-10	MVNV-M120-10	M12 x 1.5	10	10.0	40.0	50	
	NVNV-M120-5	–	M12 x 1.5	10	5.0	35.0	50	
	NVNV-M160-10	–	M16 x 1.5	10	10.0	40.0	50	
	NVNV-M160-5	–	M16 x 1.5	10	5.0	35.0	50	
	NVNV-M162-10	–	M16 x 1.5	12	10.0	43.0	50	
	NVNV-M162-5	–	M16 x 1.5	12	5.0	38.0	50	
	NVNV-M202-10	MVNV-M202-10	M20 x 1.5	12	10.0	43.0	50	
	NVNV-M202-6	–	M20 x 1.5	12	6.0	39.0	50	
	NVNV-M207-10	MVNV-M207-10	M20 x 1.5	17	10.0	51.0	50	
	NVNV-M207-6	–	M20 x 1.5	17	6.0	47.0	50	
	NVNV-M257-11	MVNV-M257-11	M25 x 1.5	17	11.0	52.0	50	
	NVNV-M257-7	–	M25 x 1.5	17	7.0	48.0	50	
	NVNV-M253-11	MVNV-M253-11	M25 x 1.5	23	11.0	54.0	30	
	NVNV-M253-7	–	M25 x 1.5	23	7.0	50.0	30	
	NVNV-M323-13	MVNV-M323-13	M32 x 1.5	23	13.0	56.0	30	
	NVNV-M323-8	–	M32 x 1.5	23	8.0	51.0	30	
	NVNV-M329-13	MVNV-M329-13	M32 x 1.5	29	13.0	57.3	20	
	NVNV-M329-8	–	M32 x 1.5	29	8.0	52.3	20	
	NVNV-M409-13	MVNV-M409-13	M40 x 1.5	29	13.0	57.3	20	
	NVNV-M409-8	–	M40 x 1.5	29	8.0	52.3	20	
	NVNV-M406-13	MVNV-M406-13	M40 x 1.5	36	13.0	71.4	20	
	NVNV-M406-8	–	M40 x 1.5	36	8.0	66.4	20	
	NVNV-M506-14	–	M50 x 1.5	36	14.0	72.4	20	
	NVNV-M506-9	–	M50 x 1.5	36	9.0	67.4	20	
	<b>Approvals</b>	NVNV-M508-14	MVNV-M508-14	M50 x 1.5	48	14.0	72.4	10
		NVNV-M508-9	–	M50 x 1.5	48	9.0	67.4	10
		NVNV-M638-14	MVNV-M638-14	M63 x 1.5	48	14.0	72.4	10
		NVNV-M638-10	–	M63 x 1.5	48	10.0	68.4	10

For applications in railway vehicles and heavy machine construction  
High thread and system connection strength


<sup>1</sup> IP68GT available. Please add  
“GT” prior to the thread length  
(for example NVNV-M120GT-10)



## Swivel fittings, metric, metal thread

### Type SNV

Type SNV - Swivel metal thread fitting, metric thread, IP68

	Order no. black	Thread metric	Fits to conduit size NW	Thread length (mm)	Overall length (mm)	PU (pcs)
	NSNV-M120-10	M12 x 1.5	10	10.0	50.5	1
	NSNV-M162-10	M16 x 1.5	12	10.0	53.5	1
	NSNV-M207-10	M20 x 1.5	17	10.0	62.5	1
	NSNV-M253-11	M25 x 1.5	23	11.0	67.5	1
	NSNV-M329-13	M32 x 1.5	29	13.0	72.0	1
	NSNV-M329-7	M32 x 1.5	29	7.0	66.0	1
	NSNV-M406-13	M40 x 1.5	36	13.0	85.5	1
	NSNV-M406-7	M40 x 1.5	36	7.0	79.5	1
	NSNV-M409-13	M40 x 1.5	29	13.0	72.0	1
	NSNV-M508-14	M50 x 1.5	48	14.0	87.5	1
	NSNV-M638-14	M63 x 1.5	48	14.0	84.0	1

#### Approvals




For applications with high technical requirements  
 Very high impact resistance  
 High thread and system connection strength  
 Vibration-proof connection to PMA conduits  
 Suitable for occasional rotation  
 Easy installation  
 High conduit pull-out strength  
 Very good chemical properties  
 Fits both conduit profiles - fine (T) and coarse (G)

## Metric fittings, polyamide thread

### Type VNDZ/VNZ

#### Type VNDZ/VNZ - Straight fitting with strain relief, metric thread

	Order no. IP66 ①	Order no. IP68* ① ②	Thread metric	Fits to conduit size NW	Terminal range	Thread length (mm)	Overall length (mm)	PU (pcs)
	BVNDZ-M160GT	–	M16 x 1.5	10	5.0–10.0	8.0	62.0	50
	BVNDZ-M162GT	BVNZ-M162S	M16 x 1.5	12	5.0–10.0	8.0	62.0	50
	BVNDZ-M207GT	BVNZ-M207S	M20 x 1.5	17	10.0–14.0	8.0	72.0	50
	BVNDZ-M253GT	BVNZ-M253S	M25 x 1.5	23	13.0–18.0	8.0	81.0	30
	BVNDZ-M329GT	BVNZ-M329S	M32 x 1.5	29	18.0–25.0	10.0	85.0	20
	BVNDZ-M406GT	BVNZ-M406S	M40 x 1.5	36	22.0–32.0	10.0	108.5	20
	BVNDZ-M508GT	BVNZ-M508S	M50 x 1.5	48	30.0–38.0	12.0	119.5	10
	BVNDZ-M638GT	BVNZ-M638S	M63 x 1.5	48	34.0–44.0	12.0	119.5	10

For machine and plant construction

For separation of damp and dry areas

Integrated strain relief optimally holds and seals cables

If several conductors are used with the fitting multiple sealing inserts should be considered

**Note:** For several conductors multiple sealing inserts MDE are available

① Please replace “B” for black with  
“S” for grey in front of the order no.

② IP68GT available. Please replace “S” at  
the end with “GT” (e.g. BVNZ-M207GT)

## Fittings with strain relief, metric, metal thread

### Type VNZ

Type VNZ - Straight fitting with strain relief, metric metal thread



	Order no. IP68 Compl., black ①	Order no. fitting* ①	Order no. insert	Thread metric	Fits to conduit size NW	Terminal range (mm)	Thread length (mm)	Overall length (mm)	PU (pcs)
	NVNZ-M120S/P1	NVNZ-M120R/P	EK150p7	M12 x 1.5	10	4.0–6.5	5.0	48.5	50
	NVNZ-M120S/P2		EK150p8	M12 x 1.5	10	5.0–8.0	5.0	48.5	50
	NVNZ-M120S/P3		EK150p9	M12 x 1.5	10	6.5–9.5	5.0	48.5	50
	NVNZ-M160S/P1	NVNZ-M160R/P	E150p7	M16 x 1.5	10	4.0–6.5	6.0	49.5	50
	NVNZ-M160S/P2		E150p8	M16 x 1.5	10	5.0–8.0	6.0	49.5	50
	NVNZ-M160S/P3		E150p9	M16 x 1.5	10	6.5–9.5	6.0	49.5	50
	NVNZ-M202S/P1	NVNZ-M202R/P	E152p7	M20 x 1.5	12	4.0–6.5	6.0	54.0	50
	NVNZ-M202S/P3		E152p9	M20 x 1.5	12	6.5–9.5	6.0	54.0	50
	NVNZ-M202S/P4		E152p11	M20 x 1.5	12	7.0–10.5	6.0	54.0	50
	NVNZ-M207S/P3	NVNZ-M207R/P	E152p9	M20 x 1.5	17	6.5–9.5	6.5	60.0	50
	NVNZ-M207S/P4		E152p11	M20 x 1.5	17	7.0–10.5	6.5	60.0	50
	NVNZ-M207S/P5		E152p13	M20 x 1.5	17	9.0–13.0	6.5	60.0	50
	NVNZ-M253S/P5	NVNZ-M253R/P	EK154p13	M25 x 1.5	23	9.0–13.0	7.5	72.5	30
	NVNZ-M253S/P6		EK154p16	M25 x 1.5	23	11.5–15.5	7.5	72.5	30
	NVNZ-M257S/P4	NVNZ-M257R/P	E153p11	M25 x 1.5	17	7.0–10.5	7.5	61.5	50
	NVNZ-M257S/P5		E153p13	M25 x 1.5	17	9.0–13.0	7.5	61.5	50
	NVNZ-M257S/P6		E153p16	M25 x 1.5	17	11.5–15.5	7.5	61.5	20
	NVNZ-M323S/P4	NVNZ-M323R/P	E154p18	M32 x 1.5	23	14.0–18.0	8.0	73.0	30
	NVNZ-M323S/P5	NVNZ-M323R1/P	E154p20	M32 x 1.5	23	17.0–20.5	8.0	73.0	30
	NVNZ-M329S/P2	NVNZ-M329R/P	EK155p18	M32 x 1.5	29	14.0–18.0	8.0	73.0	20
	NVNZ-M329S/P3		EK155p20	M32 x 1.5	29	17.0–20.5	8.0	73.0	20
	NVNZ-M329S/P4		EK155p25	M32 x 1.5	29	20.0–25.0	8.0	73.0	20
	NVNZ-M406S/P1	NVNZ-M406R/P	E156p25HF	M40 x 1.5	36	20.0–25.0	9.0	87.0	20
	NVNZ-M406S/P2		EK156p28	M40 x 1.5	36	24.0–28.0	9.0	87.0	20
	NVNZ-M409S/P1	NVNZ-M409R/P	E155p16	M40 x 1.5	29	11.5–15.5	8.0	73.0	20
	NVNZ-M409S/P2		E155p18	M40 x 1.5	29	14.0–18.0	8.0	73.0	20
	NVNZ-M409S/P3		E155p20	M40 x 1.5	29	17.0–20.5	8.0	73.0	20
	NVNZ-M409S/P4		E155p25	M40 x 1.5	29	20.0–25.0	8.0	73.0	20
	NVNZ-M409S/P5		E155p28	M40 x 1.5	29	24.0–28.0	8.0	73.0	20
	NVNZ-M506S/P1	NVNZ-M506R/P	E156p32	M50 x 1.5	36	27.0–32.0	9.0	89.5	20
	NVNZ-M506S/P3		E156p36	M50 x 1.5	36	32.0–36.0	9.0	89.5	20
	NVNZ-M508S/P2	NVNZ-M508R/P	E157p36HF	M50 x 1.5	48	32.0–36.0	9.0	92.0	10
	NVNZ-M508S/P3		E157p40HF	M50 x 1.5	48	36.0–40.0	9.0	92.0	10
NVNZ-M638S/P1	NVNZ-M638R/P	E158pm1x35	M63 x 1.5	48	32.0–35.0	10.0	90.5	10	
NVNZ-M638S/P2		E158p44	M63 x 1.5	48	39.0–44.0	10.0	90.5	10	

\*without insert

For applications in railway vehicles and heavy machine construction

For the separation of damp and dry areas

Sealing inserts are made from TPE-V

With integrated strain relief and optimal ingress protection at the cable (up to IP68/10 bar)

High thread and system connection strength

Temperature range sealing insert Pflitsch: -40°C to +135°C

**Note:** For several conductors multiple sealing inserts MDE are available

R/P version of fitting has to be used in combination with multiple sealing inserts

① IP68GT available. Please replace "S" or "R" with "GT" (e.g. NVNZ-M120GT/P1, NVNZ-M120GT/P)



## Fire barrier fittings with strain relief, metric, metal thread

### Type VNZ

Type VNZ - Fire barrier straight fitting with strain relief, metric metal thread



	Order no. IP68 Compl., black ①	Thread metric	Fits to conduit size NW	Terminal range (mm)	Thread length (mm)	Overall length (mm)	PU (pcs)
	NVNZ-M120S/B1	M12 x 1.5	10	4.0–6.5	5.0	48.5	50
	NVNZ-M120S/B2	M12 x 1.5	10	5.0–8.0	5.0	48.5	50
	NVNZ-M120S/B3	M12 x 1.5	10	6.5–9.5	5.0	48.5	50
	NVNZ-M160S/B1	M16 x 1.5	10	4.0–6.5	6.0	49.5	50
	NVNZ-M160S/B2	M16 x 1.5	10	5.0–8.0	6.0	49.5	50
	NVNZ-M160S/B3	M16 x 1.5	10	6.5–9.5	6.0	49.5	50
	NVNZ-M202S/B1	M20 x 1.5	12	4.0–6.5	6.0	54.0	50
	NVNZ-M202S/B3	M20 x 1.5	12	6.5–9.5	6.0	54.0	50
	NVNZ-M202S/B4	M20 x 1.5	12	7.0–10.5	6.0	54.0	50
	NVNZ-M207S/B1	M20 x 1.5	17	4.0–6.5	6.5	60.0	50
	NVNZ-M207S/B2	M20 x 1.5	17	5.0–8.0	6.5	60.0	50
	NVNZ-M207S/B3	M20 x 1.5	17	6.5–9.5	6.5	60.0	50
	NVNZ-M207S/B4	M20 x 1.5	17	7.0–10.5	6.5	60.0	50
	NVNZ-M207S/B5	M20 x 1.5	17	9.0–13.0	6.5	60.0	50
	NVNZ-M253S/B5	M25 x 1.5	23	9.0–13.0	7.5	72.5	30
	NVNZ-M253S/B6	M25 x 1.5	23	11.5–15.5	7.5	72.5	30
	NVNZ-M257S/B4	M25 x 1.5	17	7.0–10.0	7.5	61.5	50
	NVNZ-M257S/B5	M25 x 1.5	17	9.0–13.0	7.5	61.5	50
	NVNZ-M257S/B6	M25 x 1.5	17	11.5–15.5	7.5	61.5	50
	NVNZ-M323S/B4	M32 x 1.5	23	14.0–18.0	8.0	73.0	30
	NVNZ-M323S/B5	M32 x 1.5	23	17.0–20.5	8.0	73.0	30
	NVNZ-M329S/B2	M32 x 1.5	29	14.0–18.0	8.0	73.0	50
	NVNZ-M329S/B3	M32 x 1.5	29	17.0–20.5	8.0	73.0	50
	NVNZ-M329S/B4	M32 x 1.5	29	20.0–25.0	8.0	73.0	50
	NVNZ-M406S/B1	M40 x 1.5	36	20.0–25.0	9.0	87.0	30
	NVNZ-M406S/B2	M40 x 1.5	36	24.0–28.0	9.0	87.0	30
	NVNZ-M409S/B1	M40 x 1.5	29	11.5–15.5	8.0	73.0	20
	NVNZ-M409S/B2	M40 x 1.5	29	14.0–18.0	8.0	73.0	20
	NVNZ-M409S/B3	M40 x 1.5	29	17.0–20.5	8.0	73.0	20
	NVNZ-M409S/B4	M40 x 1.5	29	20.0–25.0	8.0	73.0	20
	NVNZ-M409S/B5	M40 x 1.5	29	24.0–28.0	8.0	73.0	20
	NVNZ-M506S/B1	M50 x 1.5	36	27.0–32.0	9.0	89.5	20
	NVNZ-M506S/B3	M50 x 1.5	36	32.0–36.0	9.0	89.5	20
NVNZ-M508S/B2	M50 x 1.5	48	32.0–36.0	9.0	92.0	10	
NVNZ-M508S/B3	M50 x 1.5	48	36.0–40.0	9.0	92.0	10	
NVNZ-M638S/B1	M63 x 1.5	48	32.0–35.0	10.0	90.5	10	
NVNZ-M638S/B2	M63 x 1.5	48	39.0–44.0	10.0	90.5	10	

\*without insert

Fire barrier function, according to standard EN45545-2/-3

For applications in railway vehicles and heavy machine construction

For the separation of damp and dry areas

Sealing inserts are made from T80S

With integrated strain relief and optimal ingress protection at the cable (up to IP68/10 bar)

High thread and system connection strength

Temperature range sealing insert Pflitsch: -40°C to +135°C

**Note:** For several conductors multiple sealing inserts MDE are available

R/P version of fitting has to be used in combination with multiple sealing inserts


① IP68GT available. Please  
replace "S" or "R" with "GT"  
(e.g. NVNZ-M120GT/P1,  
NVNZ-M120GT/P)

## Metric fittings with strain relief, long metal thread

### Type VNZ

Type VNZ - Straight fitting with strain relief, metric long metal thread



	Order no. IP68 Compl., black ①	Order no. fitting* ①	Order no. insert	Thread metric	Fits to conduit size NW	Terminal range (mm)	Thread length (mm)	Overall length (mm)	PU (pcs)
	NVNZ-M120S/P1-L	NVNZ-M120R/P-L	EK150p7	M12 x 1.5	10	4.0–6.5	15.0	66.5	50
	NVNZ-M120S/P3-L			M12 x 1.5	10	6.5–9.5	15.0	66.5	50
	NVNZ-M160S/P1-L	NVNZ-M160R/P-L	E150p7	M16 x 1.5	10	4.0–6.5	15.0	58.5	50
	NVNZ-M160S/P2-L		E150p8	M16 x 1.5	10	5.0–8.0	15.0	58.5	50
	NVNZ-M160S/P3-L		E150p9	M16 x 1.5	10	6.5–9.5	15.0	58.5	50
	NVNZ-M202S/P1-L	NVNZ-M202R/P-L	E152p7	M20 x 1.5	12	4.0–6.5	15.0	62.5	50
	NVNZ-M202S/P3-L		E152p9	M20 x 1.5	12	6.5–9.5	15.0	62.5	50
	NVNZ-M202S/P4-L		E152p11	M20 x 1.5	12	7.0–10.5	15.0	62.5	50
	NVNZ-M207S/P3-L	NVNZ-M207R/P-L	E152p9	M20 x 1.5	17	6.5–9.5	15.0	68.5	50
	NVNZ-M207S/P4-L		E152p11	M20 x 1.5	17	7.0–10.5	15.0	68.5	50
	NVNZ-M207S/P5-L		E152p13	M20 x 1.5	17	9.0–13.0	15.0	68.5	50
	NVNZ-M257S/P5-L	NVNZ-M257R/P-L	E153p13	M25 x 1.5	17	9.0–13.0	15.0	69.0	50
	NVNZ-M257S/P6-L		E153p16	M25 x 1.5	17	11.5–15.5	15.0	69.0	50
	NVNZ-M323S/P4-L	NVNZ-M323R/P-L	E154p18	M32 x 1.5	23	14.0–18.0	15.0	80.0	30
	NVNZ-M323S/P5-L	NVNZ-M323R1/P-L	E154p20	M32 x 1.5	23	17.0–20.5	15.0	80.0	30
	NVNZ-M329S/P2-L	NVNZ-M329R/P-L	E155p18	M32 x 1.5	29	14.0–18.0	15.0	91.0	20
	NVNZ-M329S/P3-L		E155p20	M32 x 1.5	29	17.0–20.5	15.0	91.0	20
	NVNZ-M409S/P3-L	NVNZ-M409R/P-L	E155p20	M40 x 1.5	29	17.0–20.5	15.0	80.0	20
	NVNZ-M409S/P4-L		E155p25	M40 x 1.5	29	20.0–25.0	15.0	80.0	20
	NVNZ-M409S/P5-L		E155p28	M40 x 1.5	29	24.0–28.0	15.0	80.0	20
	NVNZ-M506S/P1-L	NVNZ-M506R/P-L	E156p32	M50 x 1.5	36	27.0–32.0	15.0	94.5	20
	NVNZ-M506S/P3-L		E156p36	M50 x 1.5	36	32.0–36.0	15.0	94.5	20
	NVNZ-M508S/P2-L	NVNZ-M508R/P-L	E157p36HF	M50 x 1.5	48	32.0–36.0	15.0	97.0	10
	NVNZ-M508S/P3-L		E157p40HF	M50 x 1.5	48	36.0–40.0	15.0	97.0	10
	NVNZ-M638S/P1-L	NVNZ-M638R/P-L	E158pm1X35	M63 x 1.5	48	32.0–35.0	15.0	95.5	10
	NVNZ-M638S/P2-L		E158p44	M63 x 1.5	48	39.0–44.0	15.0	95.5	10

\*without insert

For applications in railway vehicles and heavy machine construction

For the separation of damp and dry areas

Sealing inserts are made from TPE-V

With integrated strain relief and optimal ingress protection at the cable (up to IP68/10 bar)

High thread and system connection strength

Temperature range sealing insert Pflitsch: -40°C to +135°C

**Note:** For several conductors multiple sealing inserts MDE are available


R/P version of fitting has to be used in combination with multiple sealing inserts

① IP68GT available. Please replace "S" or "R" with "GT" (e.g. NVNZ-M120GT/P1-L)

## Metric fittings with strain relief, long metal thread

### Type VNZ

#### Type VNZ - Straight fitting with strain relief, metric long metal thread

	Order no. IP68 Compl., black	Thread metric	Fits to conduit size NW	Terminal range (mm)	Thread length (mm)	Overall length (mm)	PU (pcs)
	NVNZ-M120S-10	M12 x 1.5	10	3.0–6.0	10.0	54.5	50
	NVNZ-M120S-5	M12 x 1.5	10	3.0–6.0	5.0	49.5	50
	NVNZ-M160S-10	M16 x 1.5	10	5.0–9.0	10.0	58.0	50
	NVNZ-M160S-5	M16 x 1.5	10	5.0–9.0	5.0	53.0	50
	NVNZ-M162S-10	M16 x 1.5	12	5.0–9.0	10.0	61.0	50
	NVNZ-M162S-5	M16 x 1.5	12	5.0–9.0	5.0	56.0	50
	NVNZ-M202S-10	M20 x 1.5	12	9.0–13.0	10.0	64.5	50
	NVNZ-M202S-6	M20 x 1.5	12	9.0–13.0	6.0	60.5	50
	NVNZ-M207S-10	M20 x 1.5	17	9.0–13.0	10.0	72.0	50
	NVNZ-M207S-6	M20 x 1.5	17	9.0–13.0	6.0	68.0	50
	NVNZ-M257S-11	M25 x 1.5	17	11.0–16.0	10.0	74.0	50
	NVNZ-M257S-7	M25 x 1.5	17	11.0–16.0	6.0	70.0	50
	NVNZ-M253S-11	M25 x 1.5	23	11.0–16.0	11.0	78.5	30
	NVNZ-M253S-7	M25 x 1.5	23	11.0–16.0	7.0	74.5	30
	NVNZ-M323S-13	M32 x 1.5	23	14.0–21.0	11.0	87.5	30
	NVNZ-M323S-8	M32 x 1.5	23	14.0–21.0	7.0	82.5	30
	NVNZ-M329S-13	M32 x 1.5	29	14.0–21.0	13.0	84.0	20
	NVNZ-M329S-8	M32 x 1.5	29	14.0–21.0	8.0	79.0	20
	NVNZ-M409S-13	M40 x 1.5	29	19.0–27.0	13.0	86.0	20
	NVNZ-M409S-8	M40 x 1.5	29	19.0–27.0	8.0	81.0	20
	NVNZ-M406S-13	M40 x 1.5	36	19.0–27.0	13.0	99.0	20
	NVNZ-M406S-8	M40 x 1.5	36	19.0–27.0	8.0	94.0	20
	NVNZ-M506S-14	M50 x 1.5	36	24.0–35.0	14.0	106.0	20
	NVNZ-M506S-9	M50 x 1.5	36	24.0–35.0	9.0	101.0	20
	NVNZ-M508S-14	M50 x 1.5	48	24.0–35.0	14.0	104.5	10
	NVNZ-M508S-9	M50 x 1.5	48	24.0–35.0	9.0	99.5	10
	NVNZ-M638S-14	M63 x 1.5	48	32.0–42.0	14.0	110.0	10
	NVNZ-M638S-10	M63 x 1.5	48	32.0–42.0	10.0	106.0	10

For applications in railway vehicles and heavy machine construction

For the separation of damp and dry areas

Very high impact resistance

With integrated strain relief for optimal ingress protection at the cable (up to IP68 / 5 bar)

High thread and system connection strength

Vibration-resistant connection to PMA conduits

Easy assembly


High conduit pull-out strength

Very good chemical properties

## Metric fittings, female polyamide thread

### Type VI

#### Type VI - Straight fitting, metric female polyamide thread

	Order no. IP66, black	Order no. IP68, black <sup>1</sup>	Thread metric	Fits to conduit size NW	Thread length (mm)	Overall length (mm)	PU (pcs)
	BVID-M12MGT	–	M12 x 1.5	07	8.0	32.0	100
	BVID-M160GT	BVIR-M160	M16 x 1.5	10	8.0	33.5	50
	BVID-M162GT	BVIR-M162	M16 x 1.5	12	8.0	36.5	50
	–	BVIR-M202	M20 x 1.5	12	8.0	36.5	50
	BVID-M207GT	BVIR-M207	M20 x 1.5	17	8.0	44.5	50
	BVID-M253GT	BVIR-M253	M25 x 1.5	23	8.0	48.5	30
	–	BVIR-M257	M25 x 1.5	17	8.0	44.5	50
	BVID-M329GT	BVIR-M329	M32 x 1.5	29	10.0	51.5	20
	BVID-M406GT	BVIR-M406	M40 x 1.5	36	10.0	65.5	20
	BVID-M508GT	BVIR-M508	M50 x 1.5	48	10.0	65.5	10
	BVID-M638GT	BVIR-M638	M63 x 1.5	48	10.0	65.5	10

#### Approvals




For cable protection systems in a wide range of applications  
 VID: IP66 static/IP54 dynamic, conduit side  
 VIR: IP68 static/IP67 dynamic, conduit side  
 No seal on female thread side

<sup>1</sup> IP68GT available. Please add  
 “GT” after the order no.

## Metric fittings, female metal thread

### Type VIR

#### Type VIR - Straight fitting, female metric metal thread

	Order no. IP68, black <sup>①</sup>	Thread metric	Fits to conduit size NW	Thread length (mm)	Overall length (mm)	PU (pcs)
	NVIR-M120	M12 x 1.5	10	7.5	35.0	50
	NVIR-M160	M16 x 1.5	10	9.0	40.5	50
	NVIR-M162	M16 x 1.5	12	9.0	42.0	50
	NVIR-M207	M20 x 1.5	17	10.0	50.0	50
	NVIR-M253	M25 x 1.5	23	10.0	56.0	30
	NVIR-M329	M32 x 1.5	29	11.0	55.5	20
	NVIR-M406	M40 x 1.5	36	13.0	71.0	20
	NVIR-M508	M50 x 1.5	48	15.0	75.0	10
	NVIR-M638	M63 x 1.5	48	17.5	76.0	10

#### Approvals




For applications in railway vehicles and heavy machine construction  
 High thread and system connection strengths  
 VIR: IP68 static/IP67 dynamic, conduit side  
 No seal on female thread side

<sup>①</sup> IP68GT available. Please add  
 "GT" after the order no.

## Metric fittings, polyamide thread

### Type VA

#### Type VA - 45° elbow fitting, metric thread

	Order no. IP66 ①	Order no. IP68* ① ②	Thread metric	Fits to conduit size NW	Thread length (mm)	External dimensions (mm)	PU (pcs)
	BVAD-M120GT	–	M12 x 1.5	10	11.0	43.5 x 37.0	50
	BVAD-M160GT	BVAV-M160	M16 x 1.5	10	11.0	43.5 x 38.0	50
	BVAD-M162GT	BVAV-M162	M16 x 1.5	12	11.0	48.0 x 40.0	50
	BVAD-M202GT	BVAV-M202	M20 x 1.5	12	11.0	48.0 x 41.5	50
	BVAD-M207GT	BVAV-M207	M20 x 1.5	17	11.0	55.5 x 51.5	50
	BVAD-M253GT	BVAV-M253	M25 x 1.5	23	12.0	65.0 x 58.5	30
	BVAD-M329GT	BVAV-M329	M32 x 1.5	29	15.0	73.5 x 66.5	20
	BVAD-M406GT	BVAV-M406	M40 x 1.5	36	19.0	92.5 x 85.5	20
	BVAD-M506GT	BVAV-M506	M50 x 1.5	36	19.0	92.5 x 89.5	20
	BVAD-M508GT	BVAV-M508	M50 x 1.5	48	19.0	100.0 x 96.0	10
	BVAD-M638GT	BVAV-M638	M63 x 1.5	48	19.0	100.0 x 104.0	10

#### Approvals




① Please replace "B" for black with "S" for grey in front of the order no.  
 ② IP68GT available. Please add "GT" after the order no.

## Metric UL fittings, polyamide thread

### Type UAV-M-UL

#### Type UAV - 45° elbow fitting, metric thread

	Order no. black	Thread metric	Fits to conduit size NW	Thread length (mm)	Outside Ø (mm)	Overall height (mm)	PU (pcs)
	BUAV-M207-UL	M20 x 1.5	17	11.0	29.5	51.5	50
	BUAV-M253-UL	M25 x 1.5	23	12.0	37.0	58.5	30
	BUAV-M329-UL	M32 x 1.5	29	15.0	44.0	66.5	20
	BUAV-M406-UL	M40 x 1.5	36	19.0	53.5	85.5	20
	BUAV-M506-UL	M50 x 1.5	36	19.0	53.5	89.5	20
	BUAV-M508-UL	M50 x 1.5	48	19.0	66.0	96.0	10
	BUAV-M638-UL	M63 x 1.5	48	19.0	66.0	104.0	10

#### Approvals




Extremely high impact resistance  
 Vibration-resistant connection to PMA FLEXPlus conduits  
 Easy installation  
 High conduit pull-out strength  
 Very good chemical properties  
 Free from halogens and cadmium  
 Fits conduit profile coarse (G)  
 Lock nut delivered with the fitting

## Metric fittings, metal thread

### Type VAV

#### Type VAV - 45° elbow fitting, metric metal thread

	Order no. IP68, black ①	Thread metric	Fits to conduit size NW	Thread length (mm)	External dimensions (mm)	PU (pcs)
	NVAV-M120-10	M12 x 1.5	10	10.0	48.5 x 37.0	50
	NVAV-M120-5	M12 x 1.5	10	5.0	43.5 x 37.0	50
	NVAV-M162-10	M16 x 1.5	12	10.0	53.0 x 40.5	50
	NVAV-M162-5	M16 x 1.5	12	5.0	48.0 x 40.5	50
	NVAV-M207-10	M20 x 1.5	17	10.0	60.5 x 51.5	50
	NVAV-M207-6	M20 x 1.5	17	6.0	56.5 x 51.5	50
	NVAV-M253-11	M25 x 1.5	23	11.0	70.0 x 60.5	30
	NVAV-M253-7	M25 x 1.5	23	7.0	66.0 x 60.5	30
	NVAV-M329-13	M32 x 1.5	29	13.0	77.0 x 68.0	20
	NVAV-M329-8	M32 x 1.5	29	8.0	72.0 x 68.0	20
	NVAV-M406-13	M40 x 1.5	36	13.0	94.0 x 87.5	20
	NVAV-M406-8	M40 x 1.5	36	8.0	89.0 x 87.5	20
	NVAV-M508-14	M50 x 1.5	48	14.0	102.0 x 101.0	10
	NVAV-M508-9	M50 x 1.5	48	9.0	97.0 x 101.0	10
	NVAV-M638-14	M63 x 1.5	48	14.0	102.0 x 104.0	10
	NVAV-M638-10	M63 x 1.5	48	10.0	98.0 x 104.0	10

#### Approvals



For applications in railway vehicles and heavy machine construction  
High thread and system connection strength


① IP68GT available. Please add  
"GT" prior to the thread  
length (e.g. NVAV-M120GT-10,  
NVBV-M120GT-10)



## Metric fittings, polyamide thread

### Type VB

#### Type VB - 90° curved elbow fitting, metric thread

	Order no. IP66 ①	Order no. IP68* ① ②	Thread metric	Fits to conduit size NW	Thread length (mm)	External dimensions (mm)	PU (pcs)
	BVBD-M207GT	BVBV-M207	M20 x 1.5	17	11.0	47.5 x 73.0	50
	BVBD-M257GT	BVBV-M257	M25 x 1.5	17	12.0	48.5 x 76.0	50
	BVBD-M253GT	BVBV-M253	M25 x 1.5	23	12.0	57.5 x 83.0	30
	BVBD-M323GT	BVBV-M323	M32 x 1.5	23	15.0	61.0 x 87.5	30
	BVBD-M329GT	BVBV-M329	M32 x 1.5	29	15.0	70.5 x 93.0	20
	BVBD-M409GT	BVBV-M409	M40 x 1.5	29	19.0	74.5 x 98.5	20
	BVBD-M406GT	BVBV-M406	M40 x 1.5	36	19.0	85.0 x 121.0	20
	BVBD-M506GT	BVBV-M506	M50 x 1.5	36	19.0	85.0 x 125.0	20
	BVBD-M508GT	BVBV-M508	M50 x 1.5	48	19.0	98.5 x 130.0	10
	BVBD-M638GT	BVBV-M638	M63 x 1.5	48	19.0	98.5 x 138.0	10

#### Approvals



For cable protection systems in a wide range of applications

Smooth elbow allows easy threading of wires and cables



**Note:** For smaller conduit sizes NW 10 to NW 12 appropriate standard elbows of type VW are also available

- ① Please replace "B" for black with "S" for grey in front of the order no.
- ② IP68GT available. Please add "GT" after the order no.

## Metric fittings, metal thread

### Type VBV

#### Type VBV - 90° curved elbow fitting, metric metal thread

	Order no. IP68, black ①	Thread metric	Fits to conduit size NW	Thread length (mm)	External dimensions (mm)	PU (pcs)
	NVBV-M207-10	M20 x 1.5	17	10.0	51.0 x 73.0	50
	NVBV-M207-6	M20 x 1.5	17	6.0	47.0 x 73.0	50
	NVBV-M257-11	M25 x 1.5	17	11.0	52.0 x 76.0	50
	NVBV-M257-7	M25 x 1.5	17	7.0	48.0 x 76.0	50
	NVBV-M253-11	M25 x 1.5	23	11.0	62.5 x 85.0	30
	NVBV-M253-7	M25 x 1.5	23	7.0	58.5 x 85.0	30
	NVBV-M323-13	M32 x 1.5	23	13.0	64.5 x 89.0	30
	NVBV-M323-8	M32 x 1.5	23	8.0	59.5 x 89.0	30
	NVBV-M329-13	M32 x 1.5	29	13.0	74.0 x 94.5	20
	NVBV-M329-8	M32 x 1.5	29	8.0	69.0 x 94.5	20
	NVBV-M409-13	M40 x 1.5	29	13.0	75.5 x 100.5	20
	NVBV-M409-8	M40 x 1.5	29	8.0	70.5 x 100.5	20
	NVBV-M406-13	M40 x 1.5	36	13.0	86.5 x 123.0	20
	NVBV-M406-8	M40 x 1.5	36	8.0	81.5 x 123.0	20
	NVBV-M506-14	M50 x 1.5	36	14.0	87.5 x 130.0	20
	NVBV-M506-9	M50 x 1.5	36	9.0	82.5 x 130.0	20
	<b>Approvals</b>	NVBV-M508-14	M50 x 1.5	48	14.0	100.5 x 135.0
	NVBV-M508-9	M50 x 1.5	48	9.0	95.5 x 135.0	10
	NVBV-M638-10	M63 x 1.5	48	14.0	100.5 x 138.0	10
	NVBV-M638-14	M63 x 1.5	48	10.0	96.5 x 138.0	10

For applications in railway vehicles and heavy machine construction  
High thread and system connection strength

Smooth elbow allows easy threading of wires and cables


**Note:** Appropriate standard elbows of type VW are available for smaller conduit sizes NW 10 to NW 12

① IP68GT available. Please add  
"GT" prior to the thread  
length (e.g. NVAV-M120GT-10,  
NVBV-M120GT-10)

## Swivel fittings, metric metal thread

### Type SBV

#### Type SBV - Swivel 90° curved elbow fitting, metric metal thread

	Order no. IP68, black ①	Thread metric	Fits to conduit size NW	Thread length (mm)	External dimensions (mm)	PU (pcs)
	NSBV-M207-10	M20 x 1.5	17	10.0	62.5 x 74.5	1
	NSBV-M253-11	M25 x 1.5	23	11.0	73.0 x 87.5	1
	NSBV-M329-13	M32 x 1.5	29	13.0	86.5 x 98.0	1
	NSBV-M406-13	M40 x 1.5	36	13.0	98.5 x 127.5	1
	NSBV-M409-13	M40 x 1.5	29	13.0	86.5 x 98.0	1
	NSBV-M508-14	M50 x 1.5	48	14.0	113.5 x 139.0	1
	NSBV-M638-14	M63 x 1.5	48	14.0	110.0 x 139.0	1

#### Approvals




For applications with high technical requirements mainly in machine building  
 Suitable for occasional rotation  
 Thread and integrated swivel adapter made from nickel-plated brass  
 High thread and system connection strength  
 Smooth elbow allows easy threading of wires and cables

① IP68GT available. Please add  
 "GT" prior to the thread length  
 (for example NSBV-M329GT-13)

## Metric fittings, polyamide thread

### Type VW

#### Type VW - 90° elbow fitting, metric thread

	Order no. IP66 ①	Order no. IP68* ① ②	Thread metric	Fits to conduit size NW	Thread length (mm)	External dimensions (mm)	PU (pcs)
	BVWD-M12MGT	BVWV-M12M	M12 x 1.5	07	11.0	32.0 x 35.0	100
	BVWD-M120GT	BVWV-M120	M12 x 1.5	10	11.0	34.0 x 39.5	50
	BVWD-M160GT	BVWV-M160	M16 x 1.5	10	11.0	34.0 x 40.5	50
	BVWD-M162GT	BVWV-M162	M16 x 1.5	12	11.0	38.5 x 46.0	50
	BVWD-M200GT	–	M20 x 1.5	10	11.0	34.0 x 42.5	50
	BVWD-M202GT	BVWV-M202	M20 x 1.5	12	11.0	38.5 x 47.5	50
	BVWD-M207GT	BVWV-M207	M20 x 1.5	17	11.0	43.5 x 58.5	50
	BVWD-M253GT	BVWV-M253	M25 x 1.5	23	12.0	54.0 x 65.0	30
	BVWD-M329GT	BVWV-M329	M32 x 1.5	29	15.0	64.5 x 73.0	20
	BVWD-M406GT	BVWV-M406	M40 x 1.5	36	19.0	78.0 x 96.0	20
	BVWD-M508GT	BVWV-M508	M50 x 1.5	48	19.0	91.5 x 106.0	10

#### Approvals




For cable protection systems in a wide range of applications  
**Note:** For sizes NW 17 to NW 48 curved elbows of type VB are also available

- ① Please replace “B” for black with “S” for grey in front of the order no.
- ② IP68GT available. Please add “GT” after the order no.

## Metric UL fittings, polyamide thread

### Type UWV-M-UL

#### Type UWV-M-UL - 90° elbow fitting, metric thread

	Order no. black	Thread metric	Fits to conduit size NW	Thread length (mm)	Overall length (mm)	Overall height (mm)	PU (pcs)
	BUWV-M207-UL	M20 x 1.5	17	11.0	58.5	43.5	50
	BUWV-M253-UL	M25 x 1.5	23	12.0	65.0	54.0	30
	BUWV-M329-UL	M32 x 1.5	29	15.0	73.0	64.5	20
	BUWV-M406-UL	M40 x 1.5	36	19.0	69.0	78.0	20
	BUWV-M508-UL	M50 x 1.5	48	19.0	106.0	91.5	10

#### Approvals





Extremely high impact resistance  
 Vibration-resistant connection to PMA FLEXPlus conduits  
 Easy installation  
 High conduit pull-out strength  
 Very good chemical properties  
 Free from halogens and cadmium  
 Fits conduit profile coarse (G)  
 Lock nut delivered with the fitting

## Metric fittings, metal thread

### Type VWV

#### Type VWV - 90° elbow fitting, metric metal thread

	Order no. IP68, black <sup>1</sup>	Thread metric	Fits to conduit size NW	Thread length (mm)	External dimensions (mm)	PU (pcs)	
	NVWV-M120-10	M12 x 1.5	10	10.0	37.5 x 39.5	50	
	NVWV-M120-5	M12 x 1.5	10	5.0	32.5 x 39.5	50	
	NVWV-M160-10	M16 x 1.5	10	10.0	37.5 x 41.5	50	
	NVWV-M160-5	M16 x 1.5	10	5.0	32.5 x 41.5	50	
	NVWV-M162-10	M16 x 1.5	12	10.0	42.0 x 46.5	50	
	NVWV-M162-5	M16 x 1.5	12	5.0	37.0 x 46.5	50	
	NVWV-M202-10	M20 x 1.5	12	10.0	42.0 x 49.0	50	
	NVWV-M202-6	M20 x 1.5	12	6.0	38.0 x 49.0	50	
	NVWV-M207-10	M20 x 1.5	17	10.0	47.0 x 58.5	30	
	NVWV-M207-6	M20 x 1.5	17	6.0	43.0 x 58.5	30	
	NVWV-M253-11	M25 x 1.5	23	11.0	59.0 x 67.0	20	
	NVWV-M253-7	M25 x 1.5	23	7.0	55.0 x 67.0	20	
	NVWV-M329-13	M32 x 1.5	29	13.0	68.0 x 74.5	20	
	NVWV-M329-8	M32 x 1.5	29	8.0	63.0 x 74.5	20	
	NVWV-M406-13	M40 x 1.5	36	13.0	80.5 x 98.0	20	
	NVWV-M406-8	M40 x 1.5	36	8.0	75.5 x 98.0	20	
	<b>Approvals</b>	NVWV-M508-14	M50 x 1.5	48	14.0	95.5 x 111.0	10
		NVWV-M508-9	M50 x 1.5	48	9.0	90.5 x 111.0	10
NVWV-M638-14		M63 x 1.5	48	14.0	94.5 x 114.0	10	
NVWV-M638-10		M63 x 1.5	48	10.0	90.5 x 114.0	10	

For applications in railway vehicles and heavy machine construction  
High thread and system connection strength

**Note:** Curved elbows of type VB are also available for sizes NW 17 to NW 48

<sup>1</sup> IP68GT available. Please add  
"GT" prior to the thread length  
(e.g. NVWV-M120GT-10)

## Metric fittings with strain relief, metal thread

### Type VWZ

Type VWZ - 90° elbow fitting with strain relief, metric metal thread



	Order no. IP68 Compl., black ①	Order no. fitting* ①	Order no. insert	Thread metric	Fits to conduit size NW	Terminal range (mm)	Thread length (mm)	Overall length (mm)	PU (pcs)
	NVWZ-M160S/P1	NVWZ-M160R/P	E150p7	M16 x 1.5	10	4.0–6.5	8.0	65.0	50
	NVWZ-M160S/P2	–	E150p8	M16 x 1.5	10	5.0–8.0	8.0	65.0	50
	NVWZ-M160S/P3	–	E150p9	M16 x 1.5	10	6.5–9.5	8.0	65.0	50
	NVWZ-M202S/P1	NVWZ-M202R/P	E152p7	M20 x 1.5	12	4.0–6.5	8.0	74.5	50
	NVWZ-M202S/P3	–	E152p9	M20 x 1.5	12	6.5–9.5	8.0	74.5	50
	NVWZ-M202S/P4	–	E152p11	M20 x 1.5	12	7.0–10.5	8.0	74.5	50
	NVWZ-M207S/P1	NVWZ-M207R/P	E152p7	M20 x 1.5	17	4.0–6.5	8.0	81.0	50
	NVWZ-M207S/P3	–	E152p9	M20 x 1.5	17	6.5–9.5	8.0	81.0	50
	NVWZ-M207S/P4	–	E152p11	M20 x 1.5	17	7.0–10.5	8.0	81.0	50
	NVWZ-M207S/P5	–	E152p13	M20 x 1.5	17	9.0–13.0	8.0	81.0	50
	NVWZ-M257S/P5	NVWZ-M257R/P	E153p13	M25 x 1.5	17	9.0–13.0	8.0	84.0	50
	NVWZ-M257S/P6	–	E153p16	M25 x 1.5	17	11.5–15.5	8.0	84.0	50

\*without insert

For applications in railway vehicles and heavy machine construction

For the separation of damp and dry areas

Straight fitting: Specially formulated polyamide 6

90° elbow: Zinc diecast

Female thread and locknut: Nickel-plated brass

Pflitsch sealing insert: TPE-V

With integrated strain relief and optimal ingress protection at the cable (up to IP68/10 bar)

High thread and system connection strength


Temperature range sealing insert Pflitsch: -40°C to +135°C

① IP68GT available. Please replace "S" or "R" with "GT" (e.g. NVWZ-M160GT/P1)

## PG fittings, polyamide thread

### Type VN

#### Type VN - Straight fitting, PG thread

	Order no. IP66 ①	Order no. IP68 ① ②	Thread PG	Fits to conduit size NW	Thread length (mm)	Overall length (mm)	PU (pcs)
	BVND-P07MGT-11	BVNV-P07M	07	07	11.0	34.5	100
	BVND-P070GT-11	BVNV-P070	07	10	11.0	36.5	100
	BVND-P072GT-11	BVNV-P072	07	12	11.0	39.0	100
	BVND-P09MGT-11	BVNV-P09M	09	07	11.0	34.5	100
	BVND-P090GT-11	BVNV-P090	09	10	11.0	36.5	100
	BVND-P092GT-11	BVNV-P092	09	12	11.0	39.0	100
	BVND-P097GT-11	BVNV-P097	09	17	11.0	47.5	100
	BVND-P11MGT-11	BVNV-P11M	11	07	11.0	34.5	100
	BVND-P110GT-11	BVNV-P110	11	10	11.0	36.5	100
	BVND-P112GT-11	BVNV-P112	11	12	11.0	39.0	100
	BVND-P117GT-11	BVNV-P117	11	17	11.0	47.5	100
	BVND-P13MGT-11	BVNV-P13M	13.5	07	11.0	34.5	100
	BVND-P130GT-11	BVNV-P130	13.5	10	11.0	36.5	100
	BVND-P132GT-11	BVNV-P132	13.5	12	11.0	39.0	100
	BVND-P137GT-11	BVNV-P137	13.5	17	11.0	47.5	100
	BVND-P160GT-11	-	16	10	11.0	36.5	100
	BVND-P162GT-11	BVNV-P162	16	12	11.0	39.0	100
	BVND-P163GT-11	BVNV-P163	16	23	11.0	51.0	100
	BVND-P167GT-11	BVNV-P167	16	17	11.0	47.5	50
	BVND-P213GT	BVNV-P213	21	23	12.0	52.0	50
	BVND-P296GT	BVNV-P296	29	36	12.0	67.5	20
	BVND-P299GT	BVNV-P299	29	29	12.0	53.0	30
	BVND-P366GT	BVNV-P366	36	36	13.0	66.0	20
	BVND-P368GT	BVNV-P368	36	48	13.0	68.5	10
	BVND-P428GT	BVNV-P428	42	48	13.0	68.5	10
	BVND-P488GT	BVNV-P488	48	48	13.0	66.5	10

#### Approvals



For cable protection systems in a wide range of applications


- ① Please replace "B" for black with "S" for grey in front of the order no.
- ② IP68GT available. Please add "GT" after the order no.



## PG fittings, metal thread

### Type VNV

#### Type VNV - Straight fitting, PG metal thread

	Order no. IP68, black ①	Order no. IP68, grey ①	Thread PG	Fits to conduit size NW	Thread length (mm)	Overall length (mm)	PU (pcs)
	NVNV-P090	MVNV-P090	09	10	12.0	42.0	50
	NVNV-P112	MVNV-P112	11	12	12.0	45.0	50
	NVNV-P137	MVNV-P137	13.5	17	13.0	54.0	50
	NVNV-P167	MVNV-P167	16	17	13.0	54.0	50
	NVNV-P213	MVNV-P213	21	23	14.0	57.0	30
	NVNV-P293	MVNV-P293	29	23	14.0	57.0	30
	NVNV-P299	MVNV-P299	29	29	14.0	58.5	20
	NVNV-P366	MVNV-P366	36	36	17.0	75.5	20
	NVNV-P488	MVNV-P488	48	48	17.0	75.5	10

#### Approvals




For applications in railway vehicles and heavy machine construction  
High thread and system connection strength

① IP68GT available. Please add  
"GT" prior to the thread length  
(for example NVNV-N022GT)

## PG fittings, polyamide thread

### Type VNDZ/VNZ

Type VNDZ/VNZ - Straight fitting with strain relief, PG thread

	Order no. IP66 ①	Order no. IP68 ① ②	Thread PG	Fits to conduit size NW	Terminal range	Thread length (mm)	Overall length (mm)	PU (pcs)
	BVNDZ-P090GT	BVNZ-P090S	09	10	4.0–8.0	7.5	56.0	50
	BVNDZ-P112GT	BVNZ-P112S	11	12	5.0–10.0	8.0	60.5	50
	BVNDZ-P132GT	BVNZ-P132S	13.5	12	6.0–12.0	9.0	62.0	50
	BVNDZ-P167GT	BVNZ-P167S	16	17	10.0–14.0	10.0	72.0	50
	BVNDZ-P213GT	BVNZ-P213S	21	23	13.0–18.0	11.0	82.0	30
	BVNDZ-P299GT	BVNZ-P299S	29	29	18.0–25.0	11.0	85.0	20
	BVNDZ-P366GT	BVNZ-P366S	36	36	22.0–32.0	13.0	112.0	20
	BVNDZ-P488GT	BVNZ-P488S	48	48	34.0–44.0	14.0	112.0	10

For machine and plant construction

For separation of damp and dry areas

Integrated strain relief optimally holds and seals cables

If several conductors are used with the fitting multiple sealing inserts should be considered


**Note:** For several conductors multiple sealing inserts MDE are available

## PG fittings with strain relief, metal thread

### Type VNZ

Type VNZ - Straight fitting with strain relief, PG metal thread



	Order no. IP68 Compl., black ①	Order no. fitting* ①	Order no. insert	Thread PG	Fits to conduit size NW	Terminal range (mm)	Thread length (mm)	Overall length (mm)	PU (pcs)
	NVNZ-P090S/P1	NVNZ-P090R/P	E150p7	09	10	4.0–6.5	6.0	49.5	50
	NVNZ-P090S/P3	–	E150p9	09	10	6.5–9.5	6.0	49.5	50
	NVNZ-P110S/P1	NVNZ-P110R/P	E151p7	11	10	4.0–6.5	6.0	52.0	50
	NVNZ-P110S/P3	–	E151p9	11	10	6.5–9.5	6.0	52.0	50
	NVNZ-P112S/P1	NVNZ-P112R/P	E151p7	11	12	4.0–6.5	6.0	53.5	50
	NVNZ-P112S/P3	–	E151p9	11	12	6.5–9.5	6.0	53.5	50
	NVNZ-P112S/P4	–	E151p11	11	12	7.0–10.5	6.0	53.5	50
	NVNZ-P160S/P1	NVNZ-P160R/P	E152p11	16	10	4.0–6.5	6.5	52.5	50
	NVNZ-P167S/P3	NVNZ-P167R/P	E153p9	16	17	6.5–9.5	6.5	61.0	50
	NVNZ-P167S/P4	–	E153p11	16	17	7.0–10.5	6.5	61.0	50
	NVNZ-P167S/P5	–	E153p13	16	17	9.0–13.0	6.5	61.0	50
	NVNZ-P167S/P6	–	E153p16	16	17	11.5–15.5	6.5	61.0	50
	NVNZ-P213S/P1	NVNZ-P213R/P	E154p11	21	23	7.0–10.5	7.0	72.0	30
	NVNZ-P213S/P4	–	E154p18	21	23	14.0–18.0	7.0	72.0	30
	NVNZ-P213S/P5	NVNZ-P213R1/P	E154p20	21	23	17.0–20.5	7.0	72.0	30
	NVNZ-P299S/P3	NVNZ-P299R/P	E155p20	29	29	17.0–20.5	8.0	73.5	20
	NVNZ-P299S/P4	–	E155p25	29	29	20.0–25.0	8.0	73.5	20
	NVNZ-P299S/P5	–	E155p28	29	29	24.0–28.0	8.0	73.5	20
	NVNZ-P366S/P1	NVNZ-P366R/P	E156p32	36	36	27.0–32.0	9.0	88.0	20
	NVNZ-P366S/P2	–	E156p34	36	36	29.0–34.0	9.0	88.0	20
NVNZ-P366S/P3	–	E156p36	36	36	32.0–36.0	9.0	88.0	20	
NVNZ-P488S/P1	NVNZ-P488R/P	E158pm 1x35	48	48	32.0–35.0	10.0	90.5	10	
NVNZ-P488S/P2	–	E158p44	48	48	39.0–44.0	10.0	90.5	10	

\*without insert

For applications in railway vehicles and heavy machine construction

For the separation of damp and dry areas

Sealing inserts are made from TPE-V

With integrated strain relief and optimal ingress protection at the cable (up to IP68/10 bar)

High thread and system connection strength

Temperature range sealing insert Pflitsch: -40°C to +135°C

**Note:** For several conductors multiple sealing inserts MDE are available


R/P version of fitting has to be used in combination with multiple sealing inserts

① IP68GT available. Please replace “S” or “R” with “GT” (e.g. NVNZ-P112GT/P1)

## PG fittings with strain relief, metal thread

### Type VNZ

#### Type VNZ - Straight fitting with strain relief, PG metal thread

	Order no. IP68 Compl., black	Thread PG	Fits to conduit size NW	Terminal range (mm)	Thread length (mm)	Overall length (mm)	PU (pcs)
	NVNZ-P07MS	07	7	3.0–6.5	5.0	45.0	100
	NVNZ-P090S	09	10	4.0–8.0	6.0	53.0	50
	NVNZ-P110S	11	10	5.0–10.0	6.0	54.5	50
	NVNZ-P112S	11	12	5.0–10.0	6.0	57.0	50
	NVNZ-P167S	16	17	10.0–14.0	6.5	64.5	50
	NVNZ-P213S	21	23	13.0–18.0	7.0	73.0	30
	NVNZ-P299S	29	29	18.0–25.0	8.0	78.0	20
	NVNZ-P366S	36	36	24.0–32.0	9.0	94.0	20
	NVNZ-P368S/01	36	48	29.0–35.0	9.0	116.0	10
	NVNZ-P488S	48	48	34.0–44.0	10.0	102.0	10

For applications in railway vehicles and heavy machine construction

For the separation of damp and dry areas

Very high impact resistance

With integrated strain relief for optimal ingress protection at the cable (up to IP68 / 5 bar)

High thread and system connection strength

Vibration-resistant connection to PMA conduits

Easy assembly


High conduit pull-out strength

Very good chemical properties

## PG fittings, female metal thread

### Type VIZR

#### Type VIZR - Straight fitting, PG female metal thread

	Order no. IP68, black <sup>①</sup>	Thread PG	Fits to conduit size NW	Thread length (mm)	Overall length (mm)	PU (pcs)
	NVIZR-P07M	07	07	6.0	35.0	100
	NVIZR-P090	09	10	9.0	38.5	50
	NVIZR-P110	11	10	9.0	41.0	50
	NVIZR-P112	11	12	9.0	42.0	50
	NVIZR-P137	13.5	17	8.0	46.5	50
	NVIZR-P167	16	17	9.5	48.0	50
	NVIZR-P213	21	23	10.0	58.0	30
	NVIZR-P299	29	29	12.5	57.0	20
	NVIZR-P366	36	36	13.0	76.0	20
	NVIZR-P488	48	48	14.0	75.0	20


For applications in railway vehicles and heavy machine construction  
 High thread and system connection strengths  
 VIZR: IP68 static/IP67 dynamic, conduit side  
 No seal on female thread side

<sup>①</sup> IP68GT available. Please add  
 "GT" after the order no.

## PG fittings, polyamide thread

### Type VA

#### Type VA - 45° elbow fitting, PG thread

	Order no. IP66 ①	Order no. IP68 ① ②	Thread PG	Fits to conduit size NW	Thread length (mm)	External dimensions (mm)	PU (pcs)
	BVAD-P090GT	BVAV-P090	09	10	11.0	43.5 x 37.0	50
	BVAD-P112GT	BVAV-P112	11	12	11.0	48.0 x 40.0	50
	BVAD-P167GT	BVAV-P167	16	17	11.0	55.5 x 51.5	50
	BVAD-P213GT	BVAV-P213	21	23	11.0	63.0 x 58.0	30
	BVAD-P299GT	BVAV-P299	29	29	12.0	69.0 x 66.0	20
	BVAD-P366GT	BVAV-P366	36	36	13.0	86.0 x 86.0	20
	BVAD-P488GT	BVAV-P488	48	48	13.0	94.0 x 100.0	10

#### Approvals





For cable protection systems in a wide range of applications

- ① Please replace "B" for black with "S" for grey in front of the order no.
- ② IP68GT available. Please add "GT" after the order no.

## PG fittings, metal thread

### Type VAV

#### Type VAV - 45° elbow fitting, PG metal thread

	Order no. IP68, black 	Thread PG	Fits to conduit size NW	Thread length (mm)	External dimensions (mm)	PU (pcs)
	NVAV-P090	09	10	12.0	50.5 x 37.0	50
	NVAV-P112	11	12	12.0	55.0 x 40.5	50
	NVAV-P137	13.5	17	13.0	63.5 x 50.0	50
	NVAV-P167	16	17	13.0	63.5 x 50.0	50
	NVAV-P213	21	23	14.0	73.0 x 60.5	30
	NVAV-P299	29	29	14.0	78.0 x 68.0	20
	NVAV-P366	36	36	17.0	98.0 x 87.5	20
	NVAV-P488	48	48	17.0	105.0 x 101.0	10

#### Approvals




For applications in railway vehicles and heavy machine construction  
High thread and system connection strength

## PG fittings, polyamide thread

### Type VB

Type VB - 90° curved elbow fitting, PG thread

	Order no. IP66 ①	Order no. IP68 ① ②	Thread PG	Fits to conduit size NW	Thread length (mm)	External dimensions (mm)	PU (pcs)
	BVBD-P167GT	BVBV-P167	16	17	11.0	47.5 x 73.0	50
	BVBD-P213GT	BVBV-P213	21	23	12.0	57.5 x 85.0	30
	BVBD-P299GT	BVBV-P299	29	29	12.0	67.5 x 96.0	20
	BVBD-P366GT	BVBV-P366	36	36	13.0	79.0 x 123.0	20
	BVBD-P488GT	BVBV-P488	48	48	13.0	92.5 x 135.0	10

#### Approvals



For cable protection systems in a wide range of applications

Smooth elbow allows easy threading of wires and cables

**Note:** For smaller conduit sizes NW 07 to NW 12 appropriate standard elbows of type VW are also available

① Please replace "B" for black with "S" for grey in front of the order no.


② IP68GT available. Please add "GT" after the order no.



## PG fittings, metal thread

### Type VBV

#### Type VBV - 90° curved elbow fitting, PG metal thread

	Order no. IP68, black ①	Thread PG	Fits to conduit size NW	Thread length (mm)	External dimensions (mm)	PU (pcs)
	NVBV-P167	16	17	13.0	54.0 x 73.0	50
	NVBV-P213	21	23	14.0	65.5 x 85.0	30
	NVBV-P299	29	29	14.0	75.0 x 96.0	20
	NVBV-P366	36	36	17.0	90.5 x 123.0	20
	NVBV-P488	48	48	17.0	103.5 x 135.0	10

#### Approvals



For applications in railway vehicles and heavy machine construction

High thread and system connection strength

Smooth elbow allows easy threading of wires and cables


**Note:** For smaller conduit sizes NW 10 to NW 12 appropriate standard elbows of type VW are also available

① IP68GT available. Please add  
"GT" after the order no.

## Swivel fittings, PG metal thread

### Type SBV

#### Type SBV - Swivel 90° curved elbow fitting, PG metal thread

	Order no. IP68, black <sup>1</sup>	Thread PG	Fits to conduit size NW	Thread length (mm)	External dimensions (mm)	PU (pcs)
	NSBV-P167-6.5	16	17	6.5	58.0 x 74.5	1
	NSBV-P213-7	21	23	7.0	69.0 x 87.5	1
	NSBV-P299-8	29	29	8.0	80.0 x 98.0	1
	NSBV-P366-9	36	36	9.0	91.5 x 127.5	1
	NSBV-P488-10	48	48	10.0	106.0 x 139.0	1

#### Approvals




For applications with high technical requirements mainly in machine building  
 Suitable for occasional rotation  
 Thread and integrated swivel adapter made from nickel-plated brass  
 High thread and system connection strength  
 Smooth elbow allows easy threading of wires and cables

<sup>1</sup> IP68GT available. Please add  
 "GT" prior to the thread length  
 (for example NSBV-NSBV-P366GT-9)

## PG fittings, polyamide thread

### Type VW

#### Type VW - 90° elbow fitting, PG thread

	Order no. IP66 ①	Order no. IP68 ① ②	Thread PG	Fits to conduit size NW	Thread length (mm)	External dimensions (mm)	PU (pcs)
	BVWD-P07MGT-11	-	07	07	11.0	32.0 x 35.0	100
	BVWD-P070GT-11	BVWV-P070	07	10	11.0	34.0 x 39.5	50
	BVWD-P09MGT-11	-	09	07	11.0	32.0 x 36.5	100
	BVWD-P090GT-11	BVWV-P090	09	10	11.0	34.0 x 39.5	50
	BVWD-P092GT-11	-	09	12	11.0	38.5 x 44.5	50
	BVWD-P11MGT-11	-	11	07	11.0	32.0 x 38.0	100
	BVWD-P110GT-11	BVWV-P110	11	10	11.0	34.0 x 41.0	50
	BVWD-P112GT-11	BVWV-P112	11	12	11.0	38.5 x 46.0	50
	BVWD-P13MGT-11	BVWV-P13M	13.5	07	11.0	32.0 x 39.5	50
	BVWD-P130GT-11	BVWV-P130	13.5	10	11.0	34.0 x 42.5	50
	BVWD-P132GT-11	BVWV-P132	13.5	12	11.0	38.5 x 47.5	50
	BVWD-P137GT-11	BVWV-P137	13.5	17	11.0	43.5 x 58.5	50
	BVWD-P167GT-11	BVWV-P167	16	17	11.0	43.5 x 58.5	50
	BVWD-P213GT	BVWV-P213	21	23	12.0	54.0 x 67.0	30
	BVWD-P299GT	BVWV-P299	29	29	12.0	61.5 x 74.5	20
	BVWD-P366GT	BVWV-P366	36	36	13.0	72.0 x 98.0	20
	BVWD-P488GT	BVWV-P488	48	48	13.0	85.5 x 111.0	10

#### Approvals



For cable protection systems in a wide range of applications


**Note:** For sizes NW 17 to NW 48 curved elbows of type VB are also available

- ① Please replace "B" for black with "S" for grey in front of the order no.  
 ② IP68GT available. Please add "GT" after the order no.

## PG fittings, metal thread

### Type VWV

#### Type VWV - 90° elbow fitting, PG metal thread

	Order no. IP68, black ①	Order no. IP68, grey ①	Thread PG	Fits to conduit size NW	Thread length (mm)	External dimensions (mm)	PU (pcs)
	NVWV-P090	MVWV-P090	09	10	12.0	39.5 x 39.5	50
	NVWV-P112	MVWV-P112	11	12	12.0	45.5 x 45.0	50
	NVWV-P137	MVWV-P137	13.5	17	13.0	50.0 x 58.5	50
	NVWV-P167	MVWV-P167	16	17	13.0	50.0 x 58.5	50
	NVWV-P213	MVWV-P213	21	23	14.0	62.0 x 67.0	30
	NVWV-P299	MVWV-P299	29	29	14.0	69.0 x 74.5	20
	NVWV-P366	MVWV-P366	36	36	17.0	83.5 x 98.0	20
	NVWV-P488	MVWV-P488	48	48	17.0	96.5 x 111.0	10

#### Approvals




For applications in railway vehicles and heavy machine construction  
 High thread and system connection strength  
**Note:** Curved elbows of type VB are also available for sizes NW 17 to NW 48

① IP68GT available. Please add  
 "GT" after the order no.

## NPT fittings, polyamide thread

### Type VN

#### Type VN - Straight fitting, NPT thread

	Order no. IP66, black	PU (pcs)	Order no. IP68, black <sup>1</sup>	PU (pcs)	Thread NPT	Fits to conduit size NW	Thread length (mm)	Overall length (mm)
	BVND-N022GT	100	BVNV-N022	50	½"	12	13.0	41.5
	BVND-N027GT	100	BVNV-N027	50	½"	17	13.0	49.5
	BVND-N043GT	30	BVNV-N043	30	¾"	23	14.0	54.0
	BVND-N069GT	20	BVNV-N069	20	1"	29	15.0	56.0
	BVND-N076GT	20	BVNV-N076	20	1¼"	36	18.0	71.0
	BVND-N088GT	10	BVNV-N088	10	1½"	48	18.0	71.5
	BVND-N098GT	10	BVNV-N098	10	2"	48	18.0	71.5

#### Approvals




For cable protection systems in a wide range of applications

<sup>1</sup> IP68GT available. Please add "GT" after the order no.

## NPT UL fittings, polyamide thread

Type UNV-N-UL

Type UNV-N-UL - Straight fitting, NPT polyamide thread

	Order no. black	Thread size NPT	Fits to conduit size NW	Thread length (mm)	Outside Ø (mm)	Overall length (mm)	PU (pcs)
	BUNV-N027-UL	½"	17	13.0	29.5	49.5	50
	BUNV-N043-UL	¾"	23	14.0	37.0	54.0	30
	BUNV-N069-UL	1"	29	15.0	44.0	56.0	20
	BUNV-N076-UL	1¼"	36	18.0	55.0	71.0	20
	BUNV-N088-UL	1½"	48	18.0	69.0	71.5	10
	BUNV-N098-UL	2"	48	18.0	69.0	71.5	10

### Approvals




Extremely high impact resistance  
 Vibration-resistant connection to PMA FLEXPLus conduits  
 Easy installation  
 High conduit pull-out strength  
 Very good chemical properties  
 Free from halogens and cadmium  
 Fits conduit profile coarse (G)  
 Lock nuts available on request

## NPT fittings, metal thread

### Type VNV

#### Type VNV - Straight fitting, NPT metal thread

	Order no. IP68, black <sup>1</sup>	Thread NPT	Fits to conduit size NW	Thread length (mm)	Overall length (mm)	PU (pcs)
	NVNV-N022	½"	12	15.4	48.1	50
	NVNV-N027	½"	17	15.4	56.4	50
	NVNV-N043	¾"	23	15.7	58.7	30
	NVNV-N069	1"	29	19.6	63.9	20
	NVNV-N076	1¼"	36	20.2	78.6	20
	NVNV-N088	1½"	48	20.6	79.0	10
	NVNV-N098	2"	48	21.4	79.8	10

#### Approvals




For applications in railway vehicles and heavy machine construction  
High thread and system connection strength

<sup>1</sup> IP68GT available. Please add  
"GT" prior to the thread length  
(for example NVNV-N022GT)

## Swivel fittings, NPT, metal thread

### Type SNV

Type SNV - Swivel metal thread fitting, NPT thread, IP68

	Order no. black	Thread NPT	Fits to conduit size NW	Thread length (mm)	Overall length (mm)	PU (pcs)
	NSNV-N022/01	½"	12	11.8	57.4	1
	NSNV-N027/01	½"	17	11.8	66.2	1
	NSNV-N043/01	¾"	23	12.1	72.0	1
	NSNV-N069/01	1"	29	15.2	77.4	1
	NSNV-N076/01	1 ¼"	36	15.8	91.4	1
	NSNV-N088/01	1 ½"	48	16.2	92.8	1
	NSNV-N098/01	2"	48	17.0	95.1	1

#### Approvals




For applications with high technical requirements  
 Very high impact resistance  
 High thread and system connection strength  
 Vibration-proof connection to PMA conduits  
 Suitable for occasional rotation  
 Easy installation  
 High conduit pull-out strength  
 Very good chemical properties  
 Fits both conduit profiles - fine (T) and coarse (G)



## NPT fittings, polyamide thread

### Type VA

#### Type VA - 45° elbow fitting, NPT thread

	Order no. IP66, black	Order no. IP68, black <sup>1</sup>	Thread NPT	Fits to conduit size NW	Thread length (mm)	External dimensions (mm)	PU (pcs)
	BVAD-N022GT	BVAV-N022	½"	12	13.0	50.0 x 41.5	50
	BVAD-N027GT	BVAV-N027	½"	17	13.0	57.5 x 51.5	50
	BVAD-N043GT	BVAV-N043	¾"	23	14.0	67.0 x 60.0	30
	BVAD-N069GT	BVAV-N069	1"	29	15.0	73.5 x 67.0	20
	BVAD-N076GT	BVAV-N076	1¼"	36	18.0	91.5 x 85.5	20
	BVAD-N088GT	BVAV-N088	1½"	48	18.0	99.0 x 96.0	10
	–	BVAV-N098	2"	48	18.0	99.0 x 101.0	10

#### Approvals




For cable protection systems in a wide range of applications

<sup>1</sup> IP68GT available. Please add "GT" after the order no.

## NPT UL fittings, polyamide thread

### Type UAV-N-UL

Type UAV-N-UL - 45° elbow fitting, NPT polyamide thread

	Order no. black	Thread size NPT	Fits to conduit size NW	Thread length (mm)	Outside Ø (mm)	Overall length (mm)	Overall height (mm)	PU (pcs)	
	UNV-N-UL	BUAV-N027-UL	½"	17	13.0	29.5	57.5	51.5	50
	BUAV-N043-UL	¾"	23	14.0	37.0	67.0	60.0	30	
	BUAV-N069-UL	1"	29	15.0	44.0	73.5	67.0	20	
	BUAV-N076-UL	1¼"	36	18.0	53.5	91.5	85.5	20	
	BUAV-N088-UL	1½"	36	18.0	66.0	99.0	96.0	10	
	BUAV-N098-UL	2"	48	18.0	66.0	99.0	101.0	10	

#### Approvals




Extremely high impact resistance  
 Vibration-resistant connection to PMA FLEXPLus conduits  
 Easy installation  
 High conduit pull-out strength  
 Very good chemical properties  
 Free from halogens and cadmium  
 Fits conduit profile coarse (G)  
 Lock nuts available on request

## Swivel fittings, NPT metal thread

Type SWV/SBV

Type SWV/SBV - Swivel 90° curved elbow fitting, NPT metal thread

	Order no. IP68, black ①	Thread NPT	Fits to conduit size NW	Thread length (mm)	External dimensions (mm)	PU (pcs)
	NSWV-N022/01	½"	12	15.4	57.0 x 48.5	1
	NSBV-N027/01	½"	17	15.4	66.5 x 74.5	1
	NSBV-N043/01	¾"	23	15.7	77.5 x 87.5	1
	NSBV-N069/01	1"	29	19.6	92.0 x 98.0	1
	NSBV-N076/01	1¼"	36	20.2	104.5 x 125.5	1
	NSBV-N088/01	1½"	48	20.6	118.5 x 138.5	1
	NSBV-N098/01	2"	48	21.4	119.5 x 138.5	1

### Approvals




For applications with high technical requirements mainly in heavy machine building and rail applications  
 Suitable for occasional rotation  
 Thread and integrated swivel adapter made from colourless anodized aluminium  
 High thread and system connection strength  
 Smooth elbow allows easy threading of wires and cables

① IP68GT available. Please add  
 "GT" prior to the thread length  
 (for example NSBV-M329GT-13)

## NPT fittings, polyamide thread

### Type VW

Type VW - 90° elbow fitting, NPT polyamide thread

	Order no. IP66, black	Order no. IP68, black <sup>①</sup>	Thread NPT	Fits to conduit size NW	Thread length (mm)	External dimensions (mm)	PU (pcs)
	BVWD-N022GT	BVWV-N022	½"	12	13.0	40.5 x 47.5	50
	BVWD-N027GT	BVWV-N027	½"	17	13.0	45.5 x 58.5	50
	BVWD-N043GT	BVWV-N043	¾"	23	14.0	56.0 x 66.5	30
	BVWD-N069GT	BVWV-N069	1"	29	15.0	64.5 x 73.5	20
	BVWD-N076GT	BVWV-N076	1¼"	36	18.0	77.0 x 96.0	20
	BVWD-N088GT	BVWV-N088	1½"	48	18.0	90.5 x 106.0	10
	BVWD-N098GT	BVWV-N098	2"	48	18.0	90.5 x 111.0	10

#### Approvals




For applications in railway vehicles and heavy machine construction  
High thread and system connection strength  
**Note:** Curved elbows of type VB are also available for sizes NW 17 to NW 48

<sup>①</sup> IP68GT available. Please add  
"GT" after the order no.

## NPT UL fittings, polyamide thread

### Type UWV-N-UL

#### Type UWV-M-UL - 90° elbow fitting, NPT polyamide thread

	Order no. black	Thread size NPT	Fits to conduit size NW	Thread length (mm)	Outside Ø (mm)	Overall length (mm)	Overall height (mm)	PU (pcs)
	BUWV-N027-UL	½"	17	13.0	29.5	58.5	45.5	50
	BUWV-N043-UL	¾"	23	14.0	37.0	66.5	56.0	30
	BUWV-N069-UL	1"	29	15.0	44.0	73.5	64.5	20
	BUWV-N076-UL	1¼"	36	18.0	53.5	96.0	77.0	20
	BUWV-N088-UL	1½"	48	18.0	66.0	106.0	90.5	10
	BUWV-N098-UL	2"	48	18.0	66.0	111.0	90.5	10

#### Approvals




Extremely high impact resistance  
 Vibration-resistant connection to PMA FLEXPLus conduits  
 Easy installation  
 High conduit pull-out strength  
 Very good chemical properties  
 Free from halogens and cadmium  
 Fits conduit profile coarse (G)  
 Lock nuts available on request

## GAS fittings, polyamide thread


### Type VN & VW

#### Type VN - Straight fitting, GAS thread

	Order no. IP66, black	Order no. IP68, black	Thread GAS	Fits to conduit size NW	Thread length (mm)	Overall length (mm)	PU (pcs)
	BVND-G00MGT	BVNV-G00M	¼"	07	11.0	34.5	100
	BVND-G000GT	BVNV-G000	¼"	10	11.0	36.5	100
	BVND-G010GT	BVNV-G010	⅜"	10	11.0	36.5	100
	BVND-G012GT	BVNV-G012	⅜"	12	11.0	39.0	100
	BVND-G022GT	BVNV-G022	½"	12	13.0	41.0	100
	BVND-G027GT	BVNV-G027	½"	17	13.0	49.5	100
	BVND-G043GT	BVNV-G043	¾"	23	14.0	54.0	50
	BVND-G069GT	BVNV-G069	1"	29	15.0	56.0	30
	BVND-G076GT	BVNV-G076	1¼"	36	18.0	71.0	20
	BVND-G088GT	BVNV-G088	1½"	48	18.0	71.5	10
	BVND-G098GT	BVNV-G098	2"	48	18.0	71.5	10

For cable protection systems in a wide range of applications

#### Type VW - 90° elbow fitting, GAS thread


	Order no. IP66, black	Thread GAS	Fits to conduit size NW	Thread length (mm)	External dimensions (mm)	PU (pcs)
	BVWD-G00MGT	¼"	07	11.0	32.0 x 36.5	50
	BVWD-G000GT	¼"	10	11.0	34.0 x 39.5	50
	BVWD-G010GT	⅜"	10	11.0	34.0 x 40.5	50
	BVWD-G012GT	⅜"	12	11.0	38.5 x 46.0	50
	BVWD-G022GT	½"	12	13.0	40.5 x 47.5	50
	BVWD-G027GT	½"	17	13.0	45.5 x 58.5	50
	BVWD-G043GT	¾"	23	14.0	56.0 x 66.5	30
	BVWD-G069GT	1"	29	15.0	64.5 x 73.5	20
	BVWD-G076GT	1¼"	36	18.0	77.0 x 96.0	20
	BVWD-G088GT	1½"	48	18.0	90.5 x 106.0	10
	BVWD-G098GT	2"	48	18.0	90.5 x 111.0	10

For cable protection systems in a wide range of applications

# UNEF fittings, female polyamide thread


## Type VI

### Type VI - Straight fitting, UNEF female polyamide thread for AMP fittings

	Order no. IP66, black	Order no. IP68, black ①	Thread UNEF	Fits to conduit size NW	Thread length (mm)	Overall length (mm)	PU (pcs)
	BVIDA-U15MGT	BVIRA-U15M	5/8"-24	07	8.0	31.5	100
	BVIDA-U150GT	BVIRA-U150	5/8"-24	10	8.0	33.5	50
	BVIDA-U152GT	BVIRA-U152	5/8"-24	12	8.0	36.5	50
	BVIDA-U180GT	BVIRA-U180	3/4"-20	10	8.0	33.5	50
	BVIDA-U182GT	BVIRA-U182	3/4"-20	12	8.0	36.5	50
	BVIDA-U187GT	BVIRA-U187	3/4"-20	17	8.0	44.5	50
	BVIDA-U232GT	BVIRA-U232	1 5/16"-20	12	8.0	38.5	50
	BVIDA-U237GT	BVIRA-U237	1 5/16"-20	17	8.0	46.5	50
	BVIDA-U347GT	BVIRA-U347	1 3/8"-18	17	8.0	46.5	50
	BVIDA-U343GT	BVIRA-U343	1 3/8"-18	23	8.0	48.5	30
	BVIDA-U402GT	BVIRA-U402	1 5/8"-18	12	7.0	55.5	50
	BVIDA-U407GT	BVIRA-U407	1 5/8"-18	17	7.0	61.5	50
	BVIDA-U403GT	BVIRA-U403	1 5/8"-18	23	7.0	60.5	30

For cable protection systems in a wide range of applications  
 Suitable for the AMP series CPC fitting  
 VIDA: IP66 static/IP54 dynamic, conduit side. VIRA: IP68 static/IP67 dynamic, conduit side  
 No seal on female thread side

### Type VI - Straight fitting, UNEF female polyamide thread for Souriau fittings

	Order no. IP66, black	Order no. IP68, black ①	Thread UNEF	Fits to NW	Shell size UTG-6	Thread length (mm)	Overall length (mm)	PU (pcs)
	BVIDB-U162GT	BVIRB-U162	1 1/16"-24	12	12-8	4.0	43.5	50
	BVIDB-U202GT	BVIRB-U202	1 3/16"-20	12	14-12	4.5	44.0	50
	BVIDB-U232GT	BVIRB-U232	1 5/16"-20	12	16-19	4.5	49.0	50
	BVIDB-U237GT	BVIRB-U237	1 5/16"-20	17	16-19	4.5	52.0	50
	BVIDB-U267GT	BVIRB-U267	1 1/4"-18	17	18-23	4.5	52.0	50
	BVIDB-U297GT	BVIRB-U297	1 3/4"-18	17	20-28	6.5	55.5	50
	BVIDB-U293GT	BVIRB-U293	1 3/4"-18	23	20-28	6.5	52.0	30
	BVIDB-U323GT	BVIRB-U323	1 5/8"-18	23	22-35	6.5	52.0	30
	BVIDB-U357GT	BVIRB-U357	1 7/8"-18	17	24-48	6.5	58.5	50
	BVIDB-U353GT	BVIRB-U353	1 7/8"-18	23	24-48	6.5	54.0	30
	BVIDB-U359GT	BVIRB-U359	1 7/8"-18	29	24-48	6.5	50.5	20

For cable protection systems in a wide range of applications  
 Suitable for the Souriau fitting series UTG-6/ITT Cannon Trident  
 VIDB: IP66 static/IP54 dynamic, conduit side. VIRB: IP68 static/IP67 dynamic, conduit side  
 No seal on female thread side

	Order no. IP68, black ①	Thread UNEF	Fits to NW	Shell size UTG-6	Thread length (mm)	Overall length (mm)	PU (pcs)
	BVIRS-U162	1 1/16"-24	12	12	9.4	47.5	50
	BVIRS-U202	1 3/16"-20	12	14	9.4	47.5	50
	BVIRS-U237	1 5/16"-20	17	16	10.0	56.0	50
	BVIRS-U267	1 1/4"-18	17	18	9.2	55.5	50
	BVIRS-U323	1 5/8"-18	23	22	9.8	56.0	30
	BVIRS-U359	1 7/8"-18	29	24	9.7	55.5	20


For cable protection systems in a wide range of applications  
 Suitable for the Souriau fitting series UTO and UTS  
 VIRS: IP68 static/IP67 dynamic, conduit side. No seal on female thread side

① IP68GT available. Please add "GT" after the order no.

## UNEF fittings, female polyamide thread

### Type VI

Type VI - Straight fitting, UN female polyamide thread for MIL-C5015

	Order no. IP66, black	Order no. IP68, black ①	Thread UN	Fits to conduit size NW	Thread length (mm)	Overall length (mm)	PU (pcs)
	-	BVIVG-U152*	5/8" -24 UNEF	12	8.0	36.5	50
	-	BVIVG-U187*	3/4" -20 UNEF	17	9.0	46.5	50
	-	BVIVG-U210*	7/8" -20 UNEF	10	9.0	37.0	50
	BVIDG-U212GT	BVIVG-U212*	7/8" -20 UNEF	12	9.0	38.5	50
	BVIDG-U217GT	BVIVG-U217*	7/8" -20 UNEF	17	9.0	46.5	50
	BVIDG-U242GT	BVIVG-U242*	1" -20 UNEF	12	9.0	40.5	50
	-	BVIVG-U243*	1" -20 UNEF	23	9.0	55.0	30
	BVIDG-U247GT	BVIVG-U247*	1" -20 UNEF	17	9.0	47.5	50
	-	BVIVG-U292*	1 3/16" -18 UNEF	12	9.0	40.5	50
	BVIDG-U293GT	BVIVG-U293*	1 3/16" -18 UNEF	23	9.0	55.0	30
	BVIDG-U297GT	BVIVG-U297*	1 3/16" -18 UNEF	17	9.0	47.5	50
	-	BVIVG-U299*	1 3/16" -18 UNEF	29	9.0	47.0	20
	-	BVIVG-U349*	1 3/8" -18 UNEF	29	9.0	52.0	20
	-	BVIVG-U352*	1 7/16" -18 UNEF	12	9.0	39.0	50
	BVIDG-U353GT	BVIVG-U353*	1 7/16" -18 UNEF	23	9.0	52.0	30
	-	BVIVG-U356*	1 7/16" -18 UNEF	36	9.0	63.0	20
	BVIDG-U357GT	BVIVG-U357*	1 7/16" -18 UNEF	17	9.0	46.5	50
	BVIDG-U359GT	BVIVG-U359*	1 7/16" -18 UNEF	29	9.0	52.0	20
	BVIDG-U433GT	BVIVG-U433*	1 3/4" -18 UNS	23	10.0	52.0	30
	BVIDG-U436GT	BVIVG-U436*	1 3/4" -18 UNS	36	10.0	62.5	20
	-	BVIVG-U437*	1 3/4" -18 UNS	17	10.0	46.5	50
	BVIDG-U439GT	BVIVG-U439*	1 3/4" -18 UNS	29	10.0	51.5	20
	-	BVIVG-U503*	2" -18 UNS	23	10.0	51.5	30
	BVIDG-U506GT	BVIVG-U506*	2" -18 UNS	36	10.0	62.5	20
	-	BVIVG-U508*	2" -18 UNS	48	10.0	64.5	10
	BVIDG-U509GT	BVIVG-U509*	2" -18 UNS	29	10.0	55.0	20
	-	BVIVG-U563*	2 1/4" -16 UN	23	10.0	51.0	30
	BVIDG-U566GT	BVIVG-U566*	2 1/4" -16 UN	36	10.0	62.0	20
	-	BVIVG-U568*	2 1/4" -16 UN	48	10.0	64.0	10
	BVIDG-U569GT	BVIVG-U569*	2 1/4" -16 UN	29	10.0	51.0	20
	-	BVIVG-U628*	2 1/2" -16 UN	48	10.0	64.0	10

#### Approvals



For applications in machine, vehicle and traction building industries  
 Suitable for MIL fitting series C5015  
 VIDG: IP66 static/IP54 dynamic, conduit- and thread side  
 VIVG: IP68 static/IP67 dynamic, conduit- and thread side  
 No seal on female thread side  
 \* UL Recognition according to UL 1619


① IP68GT available. Please add  
 "GT" after the order no.



## Y, T piece

Type VY & VT

### Type VY - Y piece


	Order no. IP66 ①	Order no. IP68 ① ②	1 x conduit size	2 x conduit size	PU (pcs)
			NW	NW	
	BVYD-100707GT	BVYR-100707	10	07	20
	BVYD-121010GT	BVYR-121010	12	10	20
	BVYD-171212GT	BVYR-171212	17	12	20
	BVYD-231717GT	BVYR-231717	23	17	20
	BVYD-292323GT	BVYR-292323	29	23	10
	BVYD-362929GT	BVYR-362929	36	29	5
	BVYD-483636GT	BVYR-483636	48	36	5

### Approvals



Sizes can be adapted with AV conduit adapters to fit smaller conduit dimensions

### Type VT - T piece

	Order no. IP66 ①	Order no. IP68 ① ②	3 x conduit size	PU (pcs)
			NW	
	BVTD-101010GT	BVTR-101010	10	20
	BVTD-121212GT	BVTR-121212	12	20
	BVTD-171717GT	BVTR-171717	17	20
	BVTD-232323GT	BVTR-232323	23	20
	BVTD-292929GT	BVTR-292929	29	10
	BVTD-363636GT	BVTR-363636	36	5
	BVTD-484848GT	BVTR-484848	48	5

### Approvals




Sizes can be adapted with AV conduit adapters to fit smaller conduit dimensions

- ① Please replace "B" for black with "S" for grey in front of the order no.
- ② IP68GT available. Please add "GT" after the order no.

## Conduit adapters, flange 90°

### Type AV & VO

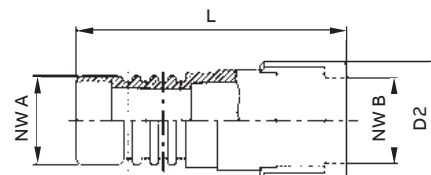
#### Type AV - Conduit adapter

	Order no. IP66, black	PU (pcs)	Order no. IP68, black	Fits to conduit size		Overall length (mm)	PU (pcs)
				NW (A)	NW (B)		
	–	–	BAVR-10/07	10	07	43.0	50
	BAVD-12/10GT	50	BAVR-12/10	12	10	46.0	50
	BAVD-17/10GT	50	BAVR-17/10	17	10	53.0	50
	BAVD-17/12GT	50	BAVR-17/12	17	12	54.0	50
	BAVD-23/10GT	30	BAVR-23/10	23	10	54.0	30
	BAVD-23/12GT	30	BAVR-23/12	23	12	53.0	30
	BAVD-23/17GT	30	BAVR-23/17	23	17	62.0	30
	BAVD-29/10GT	30	BAVR-29/10	29	10	56.5	20
	BAVD-29/12GT	30	BAVR-29/12	29	12	55.0	20
	BAVD-29/17GT	30	BAVR-29/17	29	17	61.0	20
	BAVD-29/23GT	30	BAVR-29/23	29	23	64.0	20
	BAVD-36/29GT	20	BAVR-36/29	36	29	81.0	20
	BAVD-48/36GT	10	BAVR-48/36	48	36	88.5	10

#### Approvals



Allows conduit size reduction of PMA fittings, particularly of T and Y pieces



#### Type VO - Flange 90°

	Order no. IP66 ①	Order no. IP68 ① ②	Fits to conduit size NW	Width x Length x Depth (mm)	Screw sizes	PU (pcs)
	BVOD-P213GT	BVOV-P213	23	65.5 x 70.5 x 43.2	2 x M6	30
	BVOD-P299GT	BVOV-P299	29	67.0 x 78.0 x 49.5	4 x M6	20
	BVOD-P366GT	BVOV-P366	36	85.0 x 102.0 x 65.5	4 x M6	10
	BVOD-P488GT	BVOV-P488	48	86.0 x 119.0 x 77.5	4 x M6	10




For cable protection systems in a wide range of applications  
 Flange seal FGO4 made from EPDM, flange seal FGO4/01 made from NBR  
 Temperature range with FGO4: -40°C to +105°C  
 Temperature range with FGO4/01: -25°C to +70°C

- ① Please replace "B" for black with "S" for grey in front of the order no.
- ② IP68GT available. Please add "GT" after the order no.

## Connection, splice fittings, metric and PG

### Type VNR-RE & VSG

#### Type VNR-RE - Connection fitting to solid metal tube, metric/PG

	Order no. IP66 without clamp ① ②	Order no. IP68 with clamp ① ②	Fits to conduit size NW	Steel tube metric	Inside Ø (mm)	Overall length (mm)	PU (pcs)
	BVNR-REM162	BVNR-REM162-24	12	M16	16.0	54.0	50
	BVNR-REM187	BVNR-REM187-28	17	M18	18.5	65.0	50
	BVNR-REM207	BVNR-REM207-28	17	M20	20.0	65.0	50
	BVNR-REM253	BVNR-REM253-32	23	M25	26.0	71.0	30
	BVNR-REM329	BVNR-REM329-44	29	M32	32.0	71.0	20
	BVNR-REM406	BVNR-REM406-50	36	M40	40.0	90.0	20
	BVNR-REM508	BVNR-REM508-65	48	M50	50.0	90.0	10
		Order no. IP66 without clamp ① ②	Order no. IP68 with clamp ① ②	Fits to conduit size NW	Steel tube PG	Inside Ø (mm)	Overall length (mm)
	BVNR-RE12	BVNR-RE12-24	12	PG11	18.5	56.0	50
	BVNR-RE1317	BVNR-RE1317-28	17	PG13	20.4	65.0	50
	BVNR-RE17	BVNR-RE17-28	17	PG16	22.5	65.0	50
	BVNR-RE23	BVNR-RE23-32	23	PG21	28.5	71.0	30
	BVNR-RE29	BVNR-RE29-44	29	PG29	37.0	71.0	20
	BVNR-RE36	BVNR-RE36-50	36	PG36	47.0	84.0	20
	BVNR-RE48	BVNR-RE48-65	48	PG48	59.3	90.0	10


Quick connection of solid metal tubes with flexible PMA conduits

Jubilee clip made of galvanised bright steel

Available with or without jubilee clip

IP68 on corrugated conduit side, on tube side up to IP68 with sealant

#### Type VSG - Connection splice fitting for flexible conduits

	Order no. IP66 ①	Order no. IP68 ①	Conduit size 2 x NW	Outside Ø (mm)	Overall length (mm)	PU (pcs)
	BVSGD-1212GT	BVSGR-1212	12	23.5	66.0	50
	BVSGD-1717GT	BVSGR-1717	17	29.5	87.0	50
	BVSGD-2323GT	BVSGR-2323	23	37.0	103.0	30
	BVSGD-2929GT	BVSGR-2929	29	44.0	100.0	20
	BVSGD-3636GT	BVSGR-3636	36	53.5	130.0	10
	BVSGD-4848GT	BVSGR-4848	48	66.0	133.0	10

#### Approvals



Designed for optimal connection of PMA conduits

① Please replace "B" for black with "S" for grey in front of the order no.

② IP68GT available. Please add "GT" to order no. or insert before clamp size (e.g. BVNR-REM162GT, BVNR-REM162GT-24)

# PMA Smart Line IP66

## General technical details

Modern, versatile and attractive. Functional and modern design, providing excellent value for money. Suitable for machine building, installation and construction industries.

One-piece design, IP66 protection and simple, fast installation are the outstanding features of the Smart Line. Other characteristics including a modern, functional design and an excellent price/performance ratio make this product line a very attractive solution.

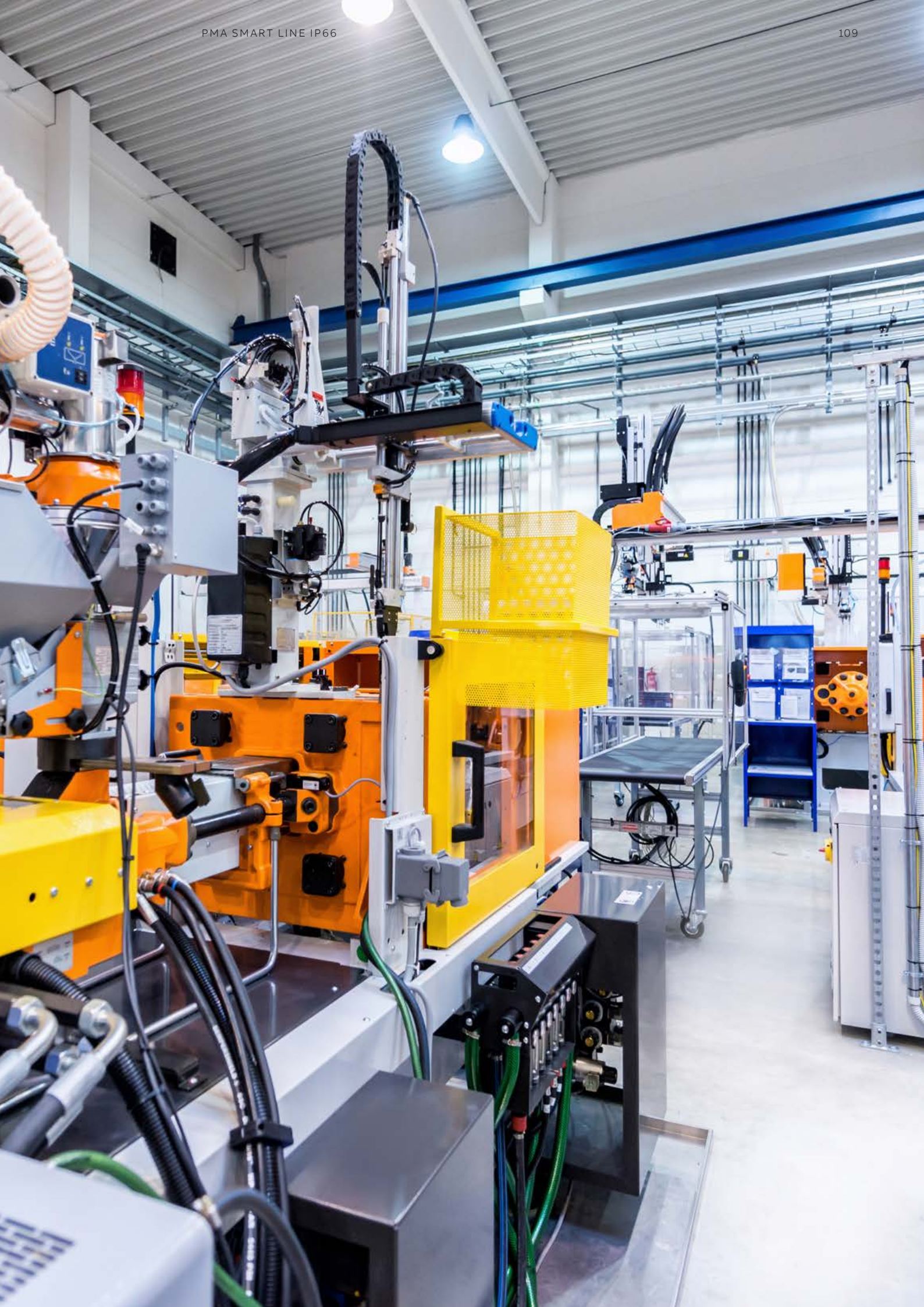
### Material

- Fittings made from specially formulated polyamide 6
- Self-extinguishing
- Free from halogens, REACH + RoHS compliant
- Temperature range:  
-45°C to +105°C, short-term to +150°C

### Characteristics

- High impact resistance
- Good conduit pull-out strength
- Vibration-proof connection to PMA conduits
- Fits conduit profiles – fine (T) and coarse (G)
- To avoid accidental opening, disassembling only possible with a screwdriver





**PMA Smart Line**

General technical details

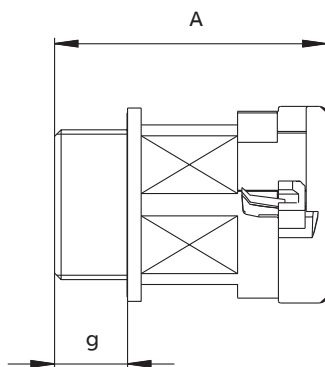


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Patent

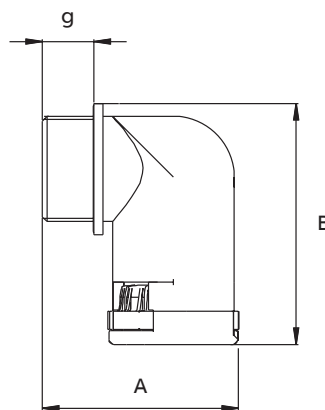
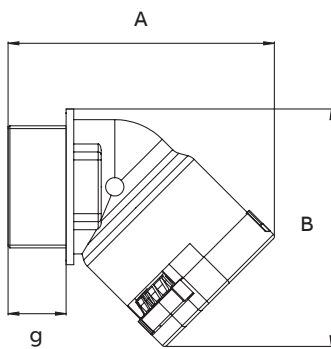
—  
IP66

**IP66 static**  
**IP54 dynamic**

- One piece fitting
- Conical sealing method
- Integrated sealing lip in thread flange
- Easy “push-in” installation
- Ready for installation (fitting gets delivered with engaged locking elements)



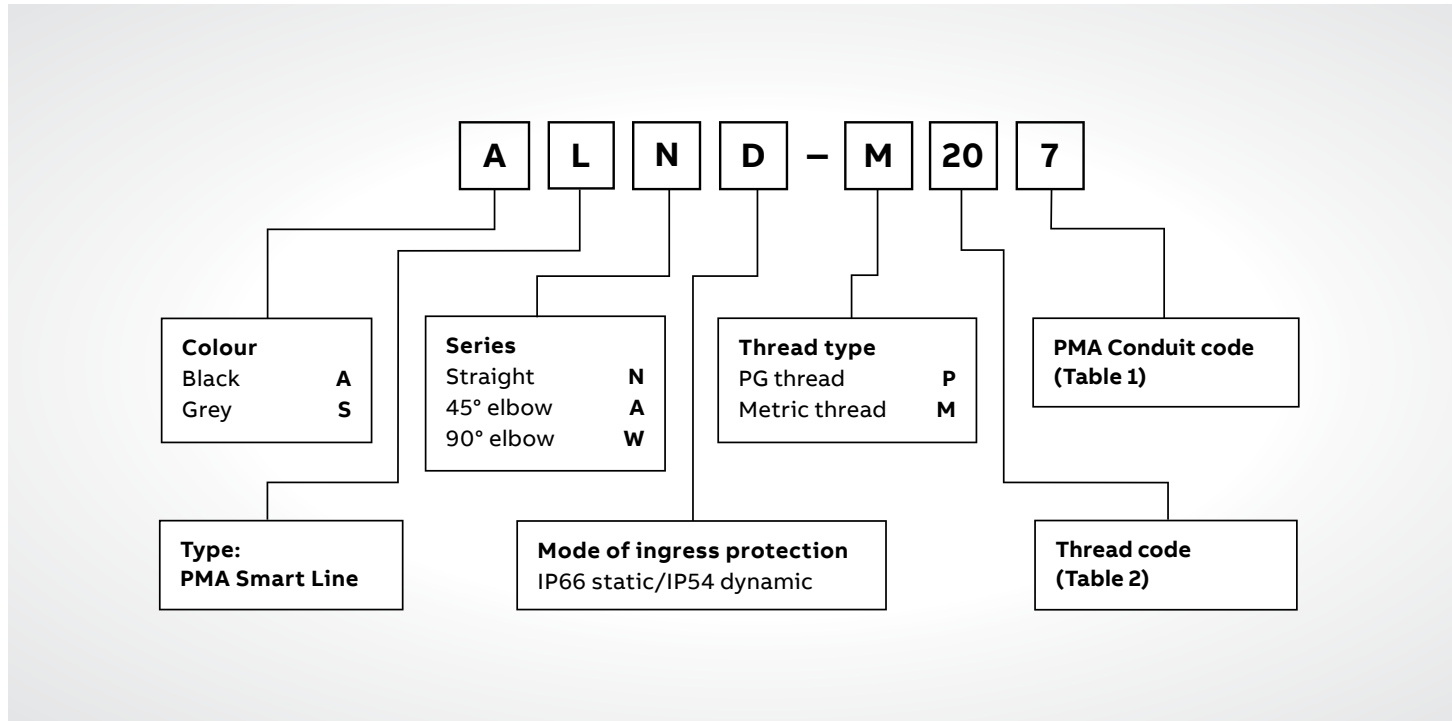
g = Thread length    A = Overall length



g = Thread length    A x B = External dimensions

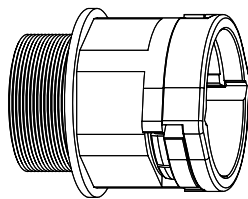
## PMA Smart Line

Part number codes

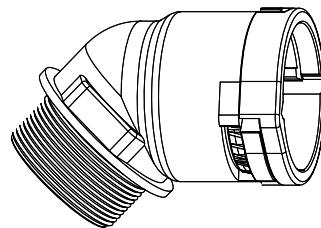


## PMA Smart Line series fittings

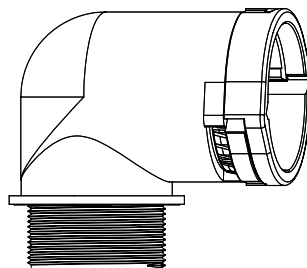
- 01 Straight (N)
- 02 45° elbow (A)
- 03 90° elbow (W)



01



02



03

## PMA Smart Line

### Size codes, installation

Table 1: Conduit codes

Nominal width	Metric size	PMA code
07	10	M
10	12	0
12	16	2
17	20	7
23	25	3
29	32	9
36	40	6
48	50	8

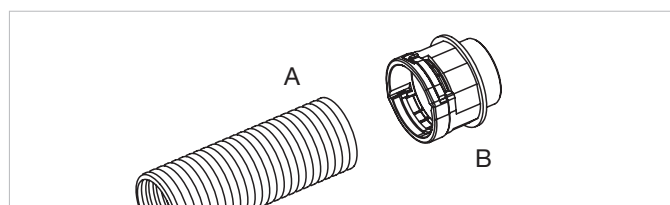
Table 2: Thread codes

Thread Metric	PMA code
M12 x 1.5	M12
M16 x 1.5	M16
M20 x 1.5	M20
M25 x 1.5	M25
M32 x 1.5	M32
M40 x 1.5	M40
M50 x 1.5	M50
M63 x 1.5	M63

Thread PG	PMA code
PG07	P07
PG09	P09
PG11	P11
PG13.5	P13
PG16	P16
PG21	P21
PG29	P29
PG36	P36
PG48	P48

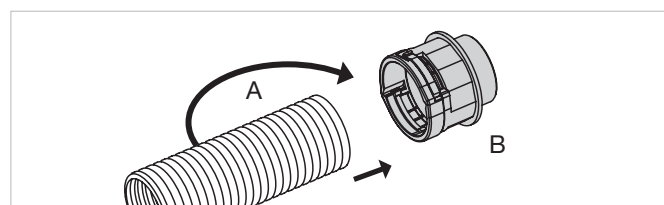
### Installation IP66

Ready for installation (fitting gets delivered with engaged locking elements).



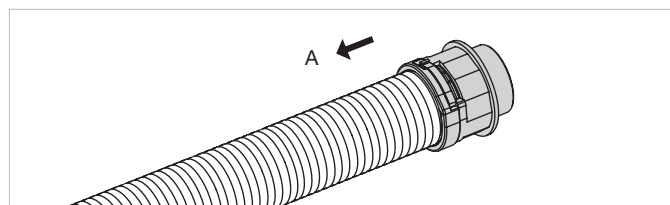
01

A = Conduit  
B = Fitting



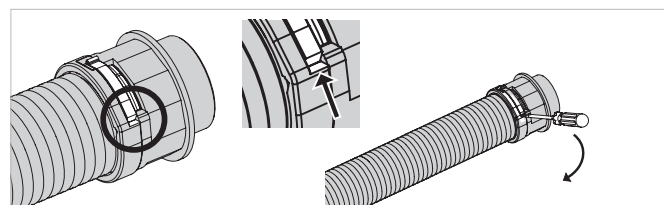
02

Push in the conduit (A) with a slight twist until the stop.



03

Pull back the conduit (A) slightly to ensure the locking mechanism is fully engaged.



04


To disengage the locking mechanism use a size 1 screwdriver.



## Metric fittings, polyamide thread


### Type LND & LAD

#### Type LND - Straight fitting, metric thread

	Order no. black, IP66	Order no. grey, IP66	Thread metric	Fits to conduit size NW	Thread length (mm)	Overall length (mm)	PU (pcs)
	ALND-M120	SLND-M120	M12 x 1.5	10	11.0	34.0	100
	ALND-M160	SLND-M160	M16 x 1.5	10	11.0	34.0	100
	ALND-M162	SLND-M162	M16 x 1.5	12	11.0	38.0	100
	ALND-M200	SLND-M200	M20 x 1.5	10	11.0	34.0	100
	ALND-M202	SLND-M202	M20 x 1.5	12	11.0	38.0	100
	ALND-M207	SLND-M207	M20 x 1.5	17	11.0	41.0	100
	ALND-M257	SLND-M257	M25 x 1.5	17	12.0	42.0	100
	ALND-M253	SLND-M253	M25 x 1.5	23	12.0	45.5	50
	ALND-M323	SLND-M323	M32 x 1.5	23	15.0	48.5	50
	ALND-M329	SLND-M329	M32 x 1.5	29	15.0	50.5	30
	ALND-M409	SLND-M409	M40 x 1.5	29	19.0	54.5	30
	ALND-M406	SLND-M406	M40 x 1.5	36	19.0	60.5	20
	ALND-M506	SLND-M506	M50 x 1.5	36	19.0	61.0	20
	ALND-M508	SLND-M508	M50 x 1.5	48	19.0	61.0	10
	ALND-M638	SLND-M638	M63 x 1.5	48	19.0	61.0	10

Easy "push-in" installation  
Ready for installation (fitting gets delivered  
with engaged locking elements)

#### Type LAD - 45° elbow fitting, metric thread


	Order no. black, IP66	Order no. grey, IP66	Thread metric	Fits to conduit size NW	Thread length (mm)	External Dimensions (mm)	PU (pcs)
	ALAD-M120	SLAD-M120	M12 x 1.5	10	11.0	42.5 x 33.0	100
	ALAD-M160	SLAD-M160	M16 x 1.5	10	11.0	42.5 x 35.0	100
	ALAD-M162	SLAD-M162	M16 x 1.5	12	11.0	47.5 x 39.5	100
	ALAD-M202	SLAD-M202	M20 x 1.5	12	11.0	47.5 x 41.5	100
	ALAD-M207	SLAD-M207	M20 x 1.5	17	11.0	54.0 x 46.0	100
	ALAD-M257	SLAD-M257	M25 x 1.5	17	12.0	55.0 x 48.5	50
	ALAD-M253	SLAD-M253	M25 x 1.5	23	12.0	63.5 x 55.5	100
	ALAD-M323	SLAD-M323	M32 x 1.5	23	15.0	67.0 x 60.0	50
	ALAD-M329	SLAD-M329	M32 x 1.5	29	15.0	72.5 x 63.5	30
	ALAD-M409	SLAD-M409	M40 x 1.5	29	19.0	76.5 x 66.5	20
	ALAD-M406	SLAD-M406	M40 x 1.5	36	19.0	87.5 x 78.0	30
	ALAD-M506	SLAD-M506	M50 x 1.5	36	19.0	88.0 x 82.0	20
	ALAD-M508	SLAD-M508	M50 x 1.5	48	19.0	97.5 x 88.0	10
	ALAD-M638	SLAD-M638	M63 x 1.5	48	19.0	97.5 x 94.5	10

Easy "push-in" installation  
Ready for installation (fitting gets delivered  
with engaged locking elements)

## Metric fittings, polyamide thread

### Type LWD

#### Type LWD - 90° elbow fitting, metric thread

	Order no. black, IP66	Order no. grey, IP66	Thread metric	Fits to conduit size NW	Thread length (mm)	External dimensions (mm)	PU (pcs)
LWD, patent	ALWD-M120	SLWD-M120	M12 x 1.5	10	11.0	33.0 x 36.5	100
	ALWD-M160	SLWD-M160	M16 x 1.5	10	11.0	33.0 x 38.5	100
	ALWD-M162	SLWD-M162	M16 x 1.5	12	11.0	37.5 x 43.0	100
	ALWD-M202	SLWD-M202	M20 x 1.5	12	11.0	37.5 x 45.0	100
	ALWD-M207	SLWD-M207	M20 x 1.5	17	11.0	42.0 x 50.5	100
	ALWD-M257	SLWD-M257	M25 x 1.5	17	12.0	43.0 x 53.0	100
	ALWD-M253	SLWD-M253	M25 x 1.5	23	12.0	52.5 x 59.0	50
	ALWD-M323	SLWD-M323	M32 x 1.5	23	15.0	56.0 x 62.5	50
	ALWD-M329	SLWD-M329	M32 x 1.5	29	15.0	62.5 x 69.0	30
	ALWD-M409	SLWD-M409	M40 x 1.5	29	19.0	66.5 x 72.0	30
	ALWD-M406	SLWD-M406	M40 x 1.5	36	19.0	76.0 x 83.0	20
	ALWD-M506	SLWD-M506	M50 x 1.5	36	19.0	76.0 x 87.0	20
	ALWD-M508	SLWD-M508	M50 x 1.5	48	19.0	89.0 x 92.5	10
	ALWD-M638	SLWD-M638	M63 x 1.5	48	19.0	89.0 x 99.0	10

Easy "push-in" installation  
Ready for installation (fitting gets delivered  
with engaged locking elements)



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# Special fittings

## Introduction

Meeting the demands of our customers. We are always looking for ways to offer our best services.


In addition to the broad ranges of fittings offered within the PMAFIX Pro, PMAFIX and Smartline product lines, PMA offers further application specific fitting solutions such as the MPNK-M series for high temperatures applications and the MONK-M to terminate an overbraided conduit.



## Metal fittings, metric


### Type MPNK & MONK

#### Type MPNK - Metal fitting for PMA conduits, metric thread

	Order no. metal	Thread metric	Fits to conduit size NW	Thread length (mm)	PU (pcs)
	MPNK-M160	M16 x 1.5	10	12.0	1
	MPNK-M162	M16 x 1.5	12	12.0	1
	MPNK-M207	M20 x 1.5	17	14.0	1
	MPNK-M253	M25 x 1.5	23	15.0	1
	MPNK-M329	M32 x 1.5	29	18.0	1

For high temperature applications  
 Suitable for high mechanical loads  
 Nickel-plated brass  
 Seals made from silicon  
 Easy introduction of wires and cables  
 Vibration-proof connection to PMAFLEX conduits  
 Very good chemical properties  
 IP68

#### Type MONK - Metal fitting for overbraided conduits, metric thread

	Order no. metal	Thread metric	Fits to conduit size NW	Thread length (mm)	PU (pcs)
	MONK-M162	M16 x 1.5	12	12.0	1
	MONK-M207	M20 x 1.5	17	14.0	1
	MONK-M253	M25 x 1.5	23	15.0	1
	MONK-M329	M32 x 1.5	29	18.0	1
	MONK-M406	M40 x 1.5	36	15.0	1
	MONK-M508	M50 x 1.5	48	16.0	1

For termination of overbraided conduits  
 For high temperature applications and applications in areas with hot metal shavings and flying sparks  
 Nickel-plated brass  
 Seals made from silicon

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# Accessories

## Introduction

For flexible and application friendly solutions. PMA offers a vast array of practical accessories in order to complete the PMA cable protection system.

We offer lock nuts produced from polyamide or metal, thread reducers and enlargers, conduit adapters, swivel adapters as well as different mounting clips for conduits. All these practical products will help to create the PMA line for our customers even more flexible and application friendly.






## Conduit terminations


### Type RKS & CT

#### Type RKS - Conduit terminal sleeve

	Order no. black	Fits to conduit size NW	Inside Ø (mm)	Outside Ø (mm)	Length (mm)	PU (pcs)
	RKS-07	07	4.5	12.5	16.0	100
	RKS-10	10	8.0	15.5	16.0	100
	RKS-12	12	10.0	19.0	20.0	100
	RKS-17	17	13.0	24.0	21.0	100
	RKS-23	23	20.0	32.0	22.0	50
	RKS-29	29	25.0	38.0	22.0	30
	RKS-36	36	33.0	46.0	25.0	20
	RKS-48	48	45.0	58.0	25.0	10
	RKS-56	56	54.0	71.0	28.0	10

For clean conduit end termination where no fitting is required  
PA 6

#### Type BCT - Conduit termination

	Order no. black	Fits to conduit size NW	Clamping range (mm)	Length (mm)	Height (mm)	PU (pcs)
	BCT-10	10	4-8	28.0	13.0	10
	BCT-12	12	5-9	35.0	16.0	10
	BCT-17	17	7-14	42.0	21.0	10
	BCT-23	23	14-22	51.0	28.0	10
	BCT-29	29	16-22	53.0	34.0	10
	BCT-36	36	16-29	55.0	42.0	10


For sealing of cables and wires at the exit from PMA corrugated conduits  
Avoids ingress of dirt and liquids  
Can be fixed additionally with cable ties  
Neoprene rubber  
Temperature range: -30°C to +120°C



## Abrasion protection, support sleeves


Type SS/SV, BES & BAS

### Type SS/SV - Abrasion protection sleeve

	Order no. black	Fits to conduit size NW	Outside Ø (mm)	Length (mm)	PU (pcs)
	BSS-17	17	42.0	22.0	50
	BSS-23	23	49.0	26.0	30
	BSS-29	29	55.0	26.0	20
	BSS-36	36	63.0	30.0	20
	BSS-48	48	75.0	30.0	10
	BSS-56G	56	90.0	33.0	10
	BSV-70G	70	108.0	60.0	10


Abrasion protection for corrugated conduits in positions exposed to chafing  
Increases the life time of moving conduits  
PA 6

### Type BES - Conduit terminal support sleeve

	Order no. black	Fits to conduit size NW	Outer diameter x height (mm)	PU (pcs)
	BES-48G	48	51 x 18	10
	BES-70G	70	80 x 23	10

Mostly used in automation applications  
Compatible with XR90, XTPC, PIS/PIH and PUE conduit  
Increases the maximum system pull-out strength  
Fits coarse profile (G-profile)

### Type BAS - Conduit support sleeve

	Order no. black	Fits to conduit size NW	Outer diameter x height (mm)	PU (pcs)
	BAS-29T	29	30 x 34	20
	BAS-36T	36	38 x 47	20
	BAS-48T	48	50 x 47	10

For PMA conduit PUET in connection with PMA connecting parts  
Increases the maximum system pull-out strength  
Protects cables and wires against damage due to sharp edges where no fittings are installed  
Material: High-grade, specially formulated polyamide 6

## Tools

### Type PMACUT & EWZ

#### Type PMACUT - Cutting tool for conduits, NW 07–48

	Order no. Cutting tool	Order no. Spare blade	For conduit size NW	Cutting range	PU (pcs)
PMACUT	PMACUT-38	FP-38	07–29	0–38	1
	PMACUT-52	FP-52	23–48	0–52	1



Can be used to cut all PMA conduits  
Enables a precise and straight cut around the corrugation  
Metal  
Colour: Red

#### Type PMACUT - Cutting tool for conduits, NW 56–125

	Order no. black	Fits to conduit size NW	Length x Width x Depth (mm)	PU (pcs)
PMACUT	PMACUT-NW56	56	337 x 101 x 15	1
	PMACUT-NW70	70	350 x 110 x 15	1
	PMACUT-NW95	95	400 x 142 x 20	1
	PMACUT-NW125	125	443 x 182 x 20	1



Can be used to cut all PMA conduits with large nominal widths  
Enables a precise and straight cut at the top of the corrugation  
High level of safety through retractable blade  
Aluminium

#### Type EWZ - Draw-in tool

	Order no. black with hole	Order no. black with handle	Fits to conduit size NW	Width x Length x Depth (mm)	PU (pcs)
EWZ	EWZ-02	EWZ-03	7.5–34	117.7 x 45.2 x 71.9	100/50

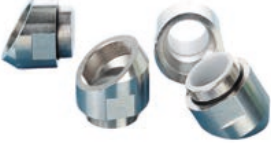


Suitable for drawing in cables or wires into PMA Divisible System conduits or other slit conduits  
Designed in a handy shape and equipped with a practical hand grip for wedging or with hole for direct holding of the wires  
Polyamide 6.6  
Colour: black

## Elbow adapters, metal swivel adapter, metric, PG

### Type MAVI, MAVIK & SWA/01

#### Type MAVI - Special 45° elbow adapter, metric thread

	Order no.	Thread metric		Thread length outside (mm)	Outside Ø (mm)	Overall length (mm)	PU (pcs)
		Inside	Outside				
	MAVI-M20/01	M20 x 1.5	M20 x 1.5	10.0	35.0	45.0	10
	MAVI-M25/01	M25 x 1.5	M25 x 1.5	11.0	39.0	51.0	10
	MAVI-M32/01	M32 x 1.5	M32 x 1.5	13.0	46.0	54.0	10
	MAVI-M40/01	M40 x 1.5	M40 x 1.5	13.0	55.0	62.0	10
	MAVI-M50/01	M50 x 1.5	M50 x 1.5	14.0	65.0	75.0	10
	MAVI-M63/01	M63 x 1.5	M63 x 1.5	14.0	80.0	84.0	10

Where a certain cable outlet angle is required

In connection with PMA fittings, especially fittings with strain relief VNZ

Enables different mounting positions: With a lock nut behind a clearance hole / In threaded holes (lock nut on MAVI side for positioning) / With SCA spin-coupler


Nickel-plated aluminium (other materials e.g. stainless steel or nickel-plated brass available on request)

High thread and system connection strength

IP68 static/IP67 dynamic

Temperature range: -60°C to +105°C

#### Type MAVIK - Positioning 45° elbow adapter, metric thread

	Order no.	Thread metric		Thread length outside (mm)	Outside Ø (mm)	Overall length (mm)	PU (pcs)
		Inside	Outside				
	MAVIK-M20/01	M20 x 1.5	M20 x 1.5	10.0	35.0	52.0	10
	MAVIK-M25/01	M25 x 1.5	M25 x 1.5	11.0	39.0	58.0	10
	MAVIK-M32/01	M32 x 1.5	M32 x 1.5	13.0	46.0	61.0	10
	MAVIK-M40/01	M40 x 1.5	M40 x 1.5	13.0	55.0	69.5	10
	MAVIK-M50/01	M50 x 1.5	M50 x 1.5	14.0	65.0	83.0	10
	MAVIK-M63/01	M63 x 1.5	M63 x 1.5	14.0	80.0	92.0	10

Where a certain cable outlet angle is required

In connection with PMA fittings, especially fittings with strain relief VNZ

The counter nut allows accurate positioning of the outlet direction in threaded holes


Adapter made from nickel-plated aluminium (other materials e.g. stainless steel or nickel-plated brass available on request), counter nut made from nickel-plated brass

High thread and system connection strength

IP68 static/IP67 dynamic

Temperature range: -60°C to +105°C

#### Type SWA/01 - Metal swivel adapter with ball bearing

	Order no.	Thread size		Outer diameter x height (mm)	PU (pcs)
		Metric	PG		
	SWA-M32-15/01	M32 x 1.5	M32 x 1.5	50 x 53.5	1
	SWA-M40-13/01	M40 x 1.5	M40 x 1.5	60 x 51.5	1
	SWA-M50-14/01	M50 x 1.5	M50 x 1.55	73 x 54.5	1
	SWA-P21/01	PG21	PG21	19 x 50	1

Used in connection with PMA fittings with metal thread


Allows PMA fittings to swivel freely in applications where high movement necessary

With thread edge protection

## Swivel and positioning adapters, metric, PG

### Type SWA & SCA

#### Type SWA - Swivel adapter with special sealing, metric/PG metal thread

	Order no.	Thread metric		Thread length (mm)	Outside Ø (mm)	Overall length (mm)	PU (pcs)
		Inside	Outside				
	SWA-M16-10	M16 x 1.5	M16 x 1.5	10.0	23.0	37.5	1
	SWA-M20-10	M20 x 1.5	M20 x 1.5	10.0	27.0	38.5	1
	SWA-M25-11	M25 x 1.5	M25 x 1.5	11.0	32.0	41.0	1
	SWA-M32-13	M32 x 1.5	M32 x 1.5	13.0	45.0	46.5	1
	SWA-M40-13	M40 x 1.5	M40 x 1.5	13.0	55.0	47.5	1
	SWA-M50-14	M50 x 1.5	M50 x 1.5	14.0	59.0	49.5	1
	SWA-M63-14	M63 x 1.5	M63 x 1.5	14.0	75.0	52.0	1
	Order no.	Thread PG		Thread length (mm)	Outside Ø (mm)	Overall length (mm)	PU (pcs)
		Inside	Outside				
	SWA-P09	09	09	15.0	23.0	44.5	1
	SWA-P11	11	11	15.0	27.0	45.5	1
	SWA-P16	16	16	15.0	32.0	48.0	1
	SWA-P21	21	21	15.0	40.0	51.0	1
	SWA-P29	29	29	15.0	50.0	52.0	1
	SWA-P36	36	36	15.0	59.0	55.0	1
	SWA-P48	48	48	15.0	70.0	55.0	1

Allow PMA fittings to swivel freely in applications where such movement is occasionally necessary


In connection with PMA fittings with metal thread

Nickel-plated brass with thread edge protection

IP68 and IP69

Temperature range: -40°C to +105°C

#### Type SCA - Positioning adapter, metric/PG metal thread

	Order no.	Thread metric		Thread length (mm)	Outside Ø (mm)	Overall length (mm)	PU (pcs)
		Inside	Outside				
	SCA-M16-10	M16 x 1.5	M16 x 1.5	10.0	22.0	32.0	1
	SCA-M20-10	M20 x 1.5	M20 x 1.5	10.0	26.0	33.0	1
	SCA-M25-11	M25 x 1.5	M25 x 1.5	11.0	32.0	35.0	1
	SCA-M32-13	M32 x 1.5	M32 x 1.5	13.0	39.0	39.5	1
	SCA-M40-13	M40 x 1.5	M40 x 1.5	13.0	50.0	41.0	1
	SCA-M50-14	M50 x 1.5	M50 x 1.5	14.0	59.0	43.5	1
	SCA-M63-14	M63 x 1.5	M63 x 1.5	14.0	75.0	45.5	1
	Order no.	Thread metric		Thread length (mm)	Outside Ø (mm)	Overall length (mm)	PU (pcs)
		Inside	Outside				
	SCA-P09	09	09	12.0	22.0	35.0	1
	SCA-P11	11	11	12.0	26.0	36.0	1
	SCA-P16	16	16	13.0	29.0	38.0	1
	SCA-P21	21	21	14.0	39.0	41.0	1
	SCA-P29	29	29	14.0	44.0	42.5	1
	SCA-P36	36	36	17.0	59.0	49.0	1
	SCA-P48	48	48	17.0	69.0	50.5	1

Allows easy positioning of elbow fittings with metal thread

In connection with PMA fittings with metal thread (Metric: Metal long thread)

Nickel-plated brass

High fastening torque with thread edge protection

P68 and IP69

Temperature range: -40°C to +105°C

## Flat gaskets, metric, PG, NPT, GAS

### Type SVN4

#### Type SVN4 - Flat thread gasket, metric/NPT/PG/GAS

Order no.	Fits to thread metric	Inside Ø (mm)	Outside Ø (mm)	Thickness (mm)	PU (pcs)
SVN4-M12.50	M12 x 1.5	12.0	20.0	1.5	50
SVN4-M12/02.50	M12 x 1.5	12.0	23.0	1.5	50
SVN4-M16.50	M16 x 1.5	16.0	22.0	1.5	50
SVN4-M16/02.50	M16 x 1.5	16.0	25.0	1.5	50
SVN4-M20.50	M20 x 1.5	20.0	27.0	1.5	50
SVN4-M20/02.50	M20 x 1.5	20.0	33.0	1.5	50
SVN4-M25.30	M25 x 1.5	25.0	35.0	1.5	30
SVN4-M25/01.30	M25 x 1.5	25.0	31.0	1.5	30
SVN4-M25/02.30	M25 x 1.5	25.0	39.0	1.5	30
SVN4-M32.20	M32 x 1.5	32.0	43.0	1.5	20
SVN4-M32/02.20	M32 x 1.5	32.0	49.0	1.5	20
SVN4-M40.20	M40 x 1.5	40.0	55.0	1.5	20
SVN4-M40/01.20	M40 x 1.5	40.0	51.0	1.5	20
SVN4-M40/02.20	M40 x 1.5	40.0	64.0	1.5	20
SVN4-M50.10	M50 x 1.5	50.0	69.0	1.5	10
SVN4-M50/01.10	M50 x 1.5	50.0	59.0	1.5	10
SVN4-M50/02.10	M50 x 1.5	50.0	74.0	1.5	10
SVN4-M63.10	M63 x 1.5	63.0	75.0	1.5	10

Order no.	Fits to thread PG	Inside Ø (mm)	Outside Ø (mm)	Thickness (mm)	PU (pcs)
SVN4-07.50	07	12.5	16.5	1.5	50
SVN4-09.50	07	15.2	20.0	1.5	50
SVN4-11.50	11	18.6	24.0	1.5	50
SVN4-13.50	13.5	20.4	31.0	1.5	50
SVN4-16.50	16	22.5	31.0	1.5	50
SVN4-21.30	21	28.3	37.0	1.5	30
SVN4-29.30	29	37.0	48.0	1.5	20
SVN4-36.20	36	47.0	57.0	1.5	20
SVN4-42.10	42	54.0	60.0	1.5	10
SVN4-48.10	48	59.3	69.0	1.5	10

Order no.	Fits to thread NPT	Inside Ø (mm)	Outside Ø (mm)	Thickness (mm)	PU (pcs)
SVN4-N02/01.50	½"	21.6	28.0	1.5	50
SVN4-N04/01.30	¾"	27.0	36.0	1.5	30
SVN4-N06/01.20	1"	33.7	46.0	1.5	20
SVN4-N07/01.20	1¼"	42.5	55.0	1.5	20
SVN4-N08/01.10	1½"	48.6	70.0	1.5	10
SVN4-N09/01.10	2"	60.7	70.0	1.5	10

Order no.	Fits to thread GAS	Inside Ø (mm)	Outside Ø (mm)	Thickness (mm)	PU (pcs)
SVN4-G00.50	¼"	13.2	20.0	1.5	50
SVN4-G01.50	⅜"	16.7	22.0	1.5	50
SVN4-G02.50	½"	21.0	28.0	1.5	50
SVN4-G04.30	¾"	26.5	34.0	1.5	30
SVN4-G06.20	1"	33.3	42.0	1.5	20
SVN4-G07.20	1¼"	41.9	53.0	1.5	10
SVN4-G08.10	1½"	47.8	62.0	1.5	20
SVN4-G09.10	2"	59.6	69.0	1.5	10

For sealing of polyamide or metal threads of PMA fittings. For ingress protection at the thread up to IP68

For solid sealing of uneven rough contact areas around the thread hole or when no constructive measures for O-Rings are provided NBR reinforced with aramide fibres (asbestos-free). Temperature range: -50°C to +200°C, short-term to +350°C


**Note:** Depending on flange sizes flat thread gaskets can have different widths. Please indicate fitting for which gasket is needed for replacement orders



## Locking clips, water impact protection

Type AFN2, OVN2 & WPS


### Type AFN2 - Universal safety clip for PMAFix fittings IP66

	Order no. dark grey	Fits to conduit size NW	Width (mm)	Length (mm)	Thickness (mm)	PU (pcs)
	AFN2-07GT.Lose	07	14.0	14.0	7.0	1
	AFN2-10GT.Lose	10	17.5	17.0	8.0	1
	AFN2-12GT.Lose	12	20.5	20.0	7.3	1
	AFN2-17GT.Lose	17	26.5	22.0	8.0	1
	AFN2-23GT.Lose	23	34.0	27.5	11.8	1
	AFN2-29GT.Lose	29	40.5	32.0	11.8	1
	AFN2-36GT.Lose	36	50.0	39.0	9.5	1
	AFN2-48GT.Lose	48	62.0	47.0	9.5	1

Pre-installed in PMA fittings IP66 and IP68GT


Allows simple push-in assembly of PMA conduits

### Type OVN2 - Oval clip for PMAFix fittings IP66

	Order no. dark grey	Fits to conduit size NW	Width (mm)	Length (mm)	Thickness (mm)	PU (pcs)
	OVN2-07.100	07	14.0	14.0	6.0	100
	OVN2-10.50	10	17.5	17.0	7.0	50
	OVN2-12.50	12	21.0	19.0	6.0	50
	OVN2-17.50	17	26.5	22.5	7.0	50
	OVN2-23.30	23	34.0	27.5	10.5	30
	OVN2-29.20	29	40.5	32.0	10.5	20
	OVN2-36.40	36	49.5	39.0	8.5	40
	OVN2-48.20	48	62.0	47.0	8.5	20

Provides reliable fixation of PMA conduits within PMA IP68 fittings

### Type WPS - Water impact protection

	Order no. black	Fits to conduit size NW	Outside Ø (mm)	Thickness (mm)	PU (pcs)
	WPS-NW10	10	22.0	8.0	50
	WPS-NW12	12	26.0	8.0	50
	WPS-NW17	17	33.0	8.0	50
	WPS-NW23	23	40.0	9.0	30
	WPS-NW29	29	47.0	9.5	20
	WPS-NW36	36	59.0	10.0	20
	WPS-NW48	48	71.0	10.0	10

Increased protection of PMAFIX fittings against water jet impact – increased protection up to IP69

For increased ingress protection requirements regarding high pressure/steam jet cleaning

Based on PMAFIX IP68 system


Two-piece water impact protection with click cap

Retrofit installation possible

## Sealing caps

### Type NVN3 & KNH2

#### Type NVN3 - Sealing cap, reinforced

	Order no.	Fits to conduit size NW	Length (mm)	PU (pcs)
	NVN3-07.100	07	9.0	100
	NVN3-09.50	10	9.0	50
	NVN3-11.50	12	12.0	50
	NVN3-16.50	17	16.5	50
	NVN3-21.30	23	13.0	30
	NVN3-29.20	29	14.0	20
	NVN3-36.20	36	17.5	20
	NVN3-48.10	48	17.5	10

In connection with PMAFIX fittings ("V" series) and PMA corrugated conduits

For ingress protection IP68 static/IP67 dynamic


Specially modified polyesterelastomer

Free from halogens and cadmium

Fits both conduit profiles: fine (T) and coarse (G)

Temperature range: -40°C to +105°C

#### Type KNH2 - PMAFIX Pro sealing and locking element

	Order no.	Fits to conduit size NW	Outside Ø (mm)	Overall length (mm)	PU (pcs)
	KNH2-NW10.50	10	22.0	28.0	50
	KNH2-NW12.50	12	25.5	33.5	50
	KNH2-NW17.50	17	31.5	38.5	50
	KNH2-NW23.30	23	38.5	41.0	30
	KNH2-NW29.20	29	46.5	46.5	20
	KNH2-NW36.20	36	55.5	50.5	20
	KNH2-NW48.10	48	68.0	56.5	10

For use in connection with PMAFIX PRO fittings PMA corrugated conduits for ingress protection IP68 and IP69 static and dynamic

Specially modified PA6/Polyester-elastomer

Free from halogens and cadmium

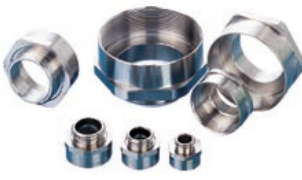
Fits conduit profiles: fine (T) and coarse (G)

Temperature range: -40°C to +105°C

## Enlargers, reducers, metric and PG


### Type ME, MR & NR

#### Type ME - Enlarger, brass, metric thread

	Order no.	Thread outside		Thread inside		Wrench size (mm)	Inside Ø (mm)	Overall length (mm)	PU (pcs)
		Metric	Length (mm)	Metric	Length (mm)				
	M12M16M	M12 x 1.5	5.0	M16 x 1.5	7.0	18	8.0	16.0	100
	M16M20M	M16 x 1.5	5.0	M20 x 1.5	7.5	22	12.0	16.5	100
	M20M25M	M20 x 1.5	6.0	M25 x 1.5	8.0	27	15.0	18.5	50
	M25M32M	M25 x 1.5	7.0	M32 x 1.5	9.0	34	21.0	20.5	25
	M32M40M	M32 x 1.5	8.0	M40 x 1.5	10	42	26.0	23.5	25
	M40M50M	M40 x 1.5	8.0	M50 x 1.5	13	52	34.0	30.0	10
	M50M63M	M50 x 1.5	9.0	M63 x 1.5	16	65	44.0	32.5	10


For enlargement of an existing thread  
 Nickel-plated brass  
 Hexagonal form  
 Temperature range: -60°C to +200°C

#### Type MR - Reducer, brass, metric thread

	Order no. standard	PU (pcs)	Order no. hexagonal	PU (pcs)	Thread outside metric	Thread inside metric
	M16M12M	100	M16M12M/6	100	M16 x 1.5	M12 x 1.5
	M20M12M	100	M20M12M/6	100	M20 x 1.5	M12 x 1.5
	M20M16M	100	M20M16M/6	100	M20 x 1.5	M16 x 1.5
	M25M16M	100	M25M16M/6	100	M25 x 1.5	M16 x 1.5
	M25M20M	100	M25M20M/6	100	M25 x 1.5	M20 x 1.5
	M32M20M	50	M32M20M/6	50	M32 x 1.5	M20 x 1.5
	M32M25M	50	M32M25M/6	50	M32 x 1.5	M25 x 1.5
	M40M25M	50	M40M25M/6	25	M40 x 1.5	M25 x 1.5
	M40M32M	50	M40M32M/6	25	M40 x 1.5	M32 x 1.5
	M50M32M	25	M50M32M/6	10	M50 x 1.5	M32 x 1.5
	M50M40M	25	M50M40M/6	10	M50 x 1.5	M40 x 1.5
	M63M40M	10	M63M40M/6	10	M63 x 1.5	M40 x 1.5
	M63M50M	10	M63M50M/6	10	M63 x 1.5	M50 x 1.5

Reduction of threaded or clearance holes to smaller thread sizes  
 Nickel-plated brass  
 Temperature range: -60°C to +200°C  
 Round form without O-ring, XXXX/6 hexagonal form with O-ring

#### Type NR - Reducer, PG

	Order no.	Thread outside PG	Thread inside PG	Length (mm)	Inside Ø (mm)	Outside Ø (mm)	PU (pcs)
	1109N	11	09	22.5	10.5	24.5	100
	1309N	13.5	09	15.0	10.0	26.0	100
	1311N	13.5	11	24.0	11.5	26.0	100
	1609N	16	09	16.0	10.0	29.0	100
	1611N	16	11	16.0	11.5	29.0	100
	1613N	16	13.5	27.0	13.5	29.0	100
	2113N	21	13.5	16.0	13.5	35.5	100
	2116N	21	16	16.0	15.5	35.5	100
	2921N	29	21	17.0	22.0	43.0	50
	3629N	36	29	24.0	30.5	54.0	50


Reduction of threaded or clearance holes to smaller PG thread sizes  
 High-grade, glass fibre reinforced Polyamid 6  
 Temperature range: -30°C to +100°C



## Firewall element, adapters

Type MA/B, MI-30 & MI-60

### Type MA/B - Firewall element, brass, metric thread

	Order no.	Inside and Outside thread size Metric	Overall length (mm)	PU (pcs)
	M16MI16M-10/B	M16 x 1.5	34.5	1
	M20MI20M-10/B	M20 x 1.5	34.5	1
	M25MI25M-11/B	M25 x 1.5	37.0	1
	M32MI32M-13/B	M32 x 1.5	41.0	1
	M40MI40M-13/B	M40 x 1.5	41.5	1
	M50MI50M-14/B	M50 x 1.5	43.5	1
	M63MI63M-14/B	M63 x 1.5	43.5	1

Nickel-plated brass


Element including intumescent material at the ends one female and one male thread

Designed to terminate a cable protection system at a fire barrier

Allowing cables to be fed through the barrier without loss of fire integrity

IP68 + IP69K

### Type MI-30 - Firewall adapter, brass, metric thread

	Order no.	Inside thread size Metric	Overall length (mm)	PU (pcs)
	MI20MI20M-30	M20 x 1.5	40.0	1
	MI25MI25M-30	M25 x 1.5	40.0	1
	MI32MI32M-30	M32 x 1.5	40.0	1
	MI40MI40M-30	M40 x 1.5	40.0	1
	MI50MI50M-30	M50 x 1.5	42.0	1
	MI63MI63M-30	M63 x 1.5	42.0	1


Nickel-plated brass

Thread adapter including intumescent material

Designed for use in combination with Roxtec modules, providing a solution allowing a cable protection system to be fed through a firewall without loss of fire integrity

IP68 + IP69K

### Type MI-60 - Firewall adapter, brass, metric thread

	Order no.	Inside thread size Metric	Overall length (mm)	PU (pcs)
	MI20MI20M-60	M20 x 1.5	70.0	1
	MI25MI25M-60	M25 x 1.5	70.0	1
	MI32MI32M-60	M32 x 1.5	70.0	1
	MI40MI40M-60	M40 x 1.5	70.0	1
	MI50MI50M-60	M50 x 1.5	70.0	1
	MI63MI63M-60	M63 x 1.5	70.0	1

Nickel-plated brass

Thread adapter including intumescent material

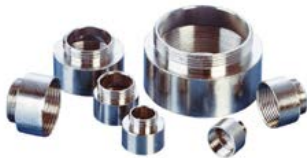
Designed for use in combination with Roxtec modules, providing a solution allowing a cable protection system to be fed through a firewall without loss of fire integrity

IP68 + IP69K

## Enlargers, reducers, PG


### Type ME & MR

#### Type ME - Enlarger, brass, PG thread

	Order no. metal, standard	Thread outside		Thread inside		Outside Ø (mm)	Overall length (mm)	PU (pcs)
		PG	Length (mm)	PG	Length (mm)			
	0709M	07	5.0	09	7.0	17.0	15.0	100
	0911M	09	6.0	11	7.0	20.0	16.5	100
	0913M	09	6.0	13	7.5	22.0	17.5	100
	1113M	11	6.0	13	8.0	22.0	17.5	100
	1116M	11	6.5	16	8.5	24.0	19.0	100
	1121M	11	6.5	21	10.0	30.0	21.0	100
	1316M	13.5	6.5	16	7.5	24.0	19.0	100
	1321M	13.5	6.5	21	8.5	30.0	21.0	100
	1621M	16	6.5	21	8.5	30.0	21.0	100
	1629M	16	6.5	29	11.0	39.0	22.5	50
	2129M	21	7.0	29	11.5	39.0	23.0	50
	2936M	29	8.0	36	12.0	50.0	27.5	25
	4248M	42	10.0	48	17.0	64.0	33.0	10

For enlargement of an existing thread  
 Nickel-plated brass  
 Temperature range: -60°C to +200°C

#### Type MR - Reducer, brass, PG thread


	Order no. metal, standard	Thread outside		Thread inside	Outside Ø (mm)	Overall length (mm)	PU (pcs)
		PG	Length (mm)	PG			
	0907M	09	6.0	07	17.0	8.5	100
	1107M	11	6.0	07	20.0	8.5	100
	1109M	11	6.0	09	20.0	8.5	100
	1307M	13.5	6.5	07	22.0	9.0	100
	1309M	13.5	6.5	09	22.0	9.0	100
	1311M	13.5	6.5	11	22.0	9.0	100
	1607M	16	6.5	07	24.0	9.5	100
	1609M	16	6.5	09	24.0	9.5	100
	1611M	16	6.5	11	24.0	9.5	100
	1613M	16	6.5	13.5	24.0	9.5	100
	2111M	21	7.0	11	30.0	10.0	100
	2113M	21	7.0	13.5	30.0	10.0	100
	2116M	21	7.0	16	30.0	10.0	100
	2916M	29	8.0	16	39.0	11.5	50
	2921M	29	8.0	21	39.0	11.5	50
	3621M	36	9.0	21	50.0	12.5	25
	3629M	36	9.0	29	50.0	12.5	25
	4229M	42	10	29	57.0	14.0	10
	4236M	42	10	36	57.0	14.0	10
	4836M	48	10	36	64.0	14.0	10
4842M	48	10	42	64.0	14.0	10	

Reduction of threaded or clearance holes to smaller thread sizes  
 Nickel-plated brass  
 Temperature range: -60°C to +200°C

## Plug screws, metric, PG

### Type 514

#### Type 514 - Plug screw, metric/PG thread


	Order no. grey	Fits to thread metric	Outside Ø (mm)	Height (mm)	Thread length (mm)	PU (pcs)
	514-M12	M12 x 1.5	15.0	10.0	6.0	100
	514-M16	M16 x 1.5	20.0	10.5	6.0	100
	514-M20	M20 x 1.5	24.0	10.5	6.0	100
	514-M25	M25 x 1.5	30.0	13.0	8.0	100
	514-M32	M32 x 1.5	37.0	13.5	8.0	100
	514-M40	M40 x 1.5	46.0	14.0	8.0	50
	514-M50	M50 x 1.5	56.0	16.5	10.0	50
	514-M63	M63 x 1.5	70.0	17.0	12.0	50
	Order no. grey	Fits to thread PG	Outside Ø (mm)	Height (mm)	Thread length (mm)	PU (pcs)
	514-07	07	15.0	10.0	6.0	100
	514-09	09	19.0	10.0	6.0	100
	514-11	11	22.0	10.0	6.0	100
	514-13	13.5	25.0	10.0	6.0	100
	514-16	16	27.0	10.0	6.0	100
	514-21	21	33.0	12.5	8.0	100
	514-29	29	44.5	13.0	8.0	100
	514-36	36	55.5	15.0	10.0	50
	514-48	48	69.5	17.0	12.0	50

For closing off unused threaded holes  
 Polyamide 6 glass fibre reinforced  
 Free from halogens and cadmium  
 IP54  
 Temperature range: -30°C to +100°C

## Lock nuts, metric, PG

### Type MN

Type MN - Hexagonal lock nut, polyamide, metric/PG thread


	Order no. black	Order no. grey	Fits to thread metric	Wrench size (mm)	Height (mm)	PU (pcs)
	BMN-M12	GMN-M12	M12 x 1.5	17	5.0	100
	BMN-M16	GMN-M16	M16 x 1.5	22	5.0	100
	BMN-M20	GMN-M20	M20 x 1.5	26	5.6	100
	BMN-M25	GMN-M25	M25 x 1.5	32	6.0	100
	BMN-M32	GMN-M32	M32 x 1.5	41	7.0	25
	BMN-M40	GMN-M40	M40 x 1.5	50	7.0	10
	BMN-M50	GMN-M50	M50 x 1.5	60	8.0	10
	BMN-M63	GMN-M63	M63 x 1.5	75	8.0	5
	Order no. black	Order no. grey	Fits to thread PG	Wrench size (mm)	Height (mm)	PU (pcs)
	BMN-07	GMN-07	07	19	5.0	100
	BMN-09	GMN-09	09	22	5.0	100
	BMN-11	GMN-11	11	24	5.0	100
	BMN-13	GMN-13	13.5	27	6.0	100
	BMN-16	GMN-16	16	30	6.0	100
	BMN-21	GMN-21	21	36	7.0	50
	BMN-29	GMN-29	29	46	7.0	25
	BMN-36	GMN-36	36	60	8.0	10
	BMN-48	GMN-48	48	70	8.0	10

Glass fibre reinforced Polyamid 6  
High tightening torques

## Lock nuts, metric, PG


### Type MM

#### Type MM - Hexagonal lock nut, brass, metric/PG thread

	Order no.	Fits to thread metric	Wrench size (mm)	Height (mm)	PU (pcs)
	GMM-M12	M12 x 1.5	15	2.8	100
	GMM-M16	M16 x 1.5	19	2.8	100
	GMM-M20	M20 x 1.5	24	3.0	100
	GMM-M25	M25 x 1.5	30	3.5	100
	GMM-M32	M32 x 1.5	36	4.0	25
	GMM-M40	M40 x 1.5	46	4.5	10
	GMM-M50	M50 x 1.5	60	5.0	5
	GMM-M63	M63 x 1.5	70	5.5	5
	Order no.	Fits to thread PG	Wrench size (mm)	Height (mm)	PU (pcs)
	GMM-07	07	15	2.8	100
	GMM-09	09	18	2.8	100
	GMM-11	11	21	3.0	100
	GMM-13	13.5	23	3.0	100
	GMM-16	16	26	3.0	50
	GMM-21	21	32	3.5	50
	GMM-29	29	41	4.0	25
	GMM-36	36	51	5.0	10
	GMM-42	42	60	5.0	5
	GMM-48	48	64	5.5	5

Nickel-plated brass  
Maximum possible torque  
Safe system connection

#### Type MM - Hexagonal lock nut, brass, metric thread for EMC applications

	Order no.	Fits to thread metric	Wrench size (mm)	Height (mm)	PU (pcs)
	GMM-M12/EMV	M12 x 1.5	16.6	3.5	100
	GMM-M16/EMV	M16 x 1.5	21.0	3.5	100
	GMM-M20/EMV	M20 x 1.5	26.7	3.7	100
	GMM-M25/EMV	M25 x 1.5	33.5	4.2	100
	GMM-M32/EMV	M32 x 1.5	39.0	4.7	100
	GMM-M40/EMV	M40 x 1.5	50.0	5.7	50
	GMM-M50/EMV	M50 x 1.5	66.0	5.7	10
	GMM-M63/EMV	M63 x 1.5	78.0	6.7	10

Nickel-plated brass  
Maximum possible torque  
Safe system connection

# PMA TRUST & system supports

## Introduction

For flexible and application friendly solutions. PMA offers a vast array of practical accessories in order to complete the PMA cable protection system.

We offer lock nuts produced from polyamide or metal, thread reducers and enlargers, conduit adapters, swivel adapters as well as different mounting clips for conduits. All these practical products will help to create the PMA line for our customers even more flexible and application friendly.





# PMA TRUST™

## Modular support system

For use in rolling stock applications.  
The most versatile, compact and lightest design of its kind on the market.



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. The system is specifically designed for use in railway vehicle construction and other applications where fixation of parallel running conduits and cables is required.

Type BGPM - PMA TRUST™ modular support system

	Order no. black	Conduit size NW	No. of conduits	Nom. dimensions (mm)			PU (pcs)
				Length	Depth	Height	
	BGPM-1x10	10	1	39.5	30.0	24.5	10
	BGPM-1x12	12	1	42.5	30.0	28.0	10
	BGPM-2x12	12	2	61.0	30.0	28.0	10
	BGPM-3x12	12	3	79.5	30.0	28.0	5
	BGPM-4x12	12	4	98.0	30.0	28.0	5
	BGPM-1x17	17	1	48.0	30.0	33.0	10
	BGPM-2x17	17	2	72.5	30.0	33.0	10
	BGPM-3x17	17	3	97.0	30.0	33.0	5
	BGPM-4x17	17	4	121.5	30.0	33.0	5
	BGPM-1x23	23	1	55.0	30.0	40.0	10
	BGPM-2x23	23	2	87.0	30.0	40.0	10
	BGPM-3x23	23	3	119.0	30.0	40.0	5
	BGPM-4x23	23	4	151.0	30.0	40.0	5
	BGPM-1x29	29	1	61.0	30.0	46.0	10
	BGPM-2x29	29	2	99.5	30.0	46.0	10
	BGPM-3x29	29	3	137.5	30.0	46.0	5
	BGPM-4x29	29	4	176.0	30.0	46.0	5
	BGPM-1x36	36	1	70.0	30.0	55.0	10
	BGPM-2x36	36	2	116.5	30.0	55.0	10
	BGPM-3x36	36	3	163.0	30.0	55.0	5
	BGPM-4x36	36	4	209.5	30.0	55.0	5
	BGPM-1x48	48	1	82.0	30.0	66.0	10
	BGPM-2x48	48	1	141.0	30.0	66.0	10
	BGPM-3x48	48	3	199.5	30.0	66.0	5
BGPM-4x48	48	4	258.5	30.0	66.0	5	

For applications in rail vehicle construction and other applications where fixation of parallel running conduits and cables is required


Light weight and compact design  
Conduit rotation possible preventing torsion  
Axial fixation of conduit and/or cables  
Quick installation, possible with one hand



## PMA TRUST™ modular support system


### Type BGPM, BGPMR & BGPMK

#### Type BGPMR - PMA TRUST™ reducers

	Order no. black	Conduit size NW	Fits to multiple holder BGPM (NW)	Fits to reduction BGPMR	Depth (mm)	PU (pcs)
	BGPMR-10T/17	10	17	17	30.0	5
	BGPMR-12T/17	12	17	17	30.0	5
	BGPMR-17GT/23	17	23	23	30.0	5
	BGPMR-23GT/29	23	29	29	30.0	5
	BGPMR-29GT/36	29	36	36	30.0	5
	BGPMR-36GT/48	36	48	-	30.0	5

Reducers for BGPM modular system support for downsizing corrugated conduits  
Provides axial strain relief for conduits, but allows rotation  
Combination of multiple reductions possible  
Easy installation

#### Type BGPMK - PMA TRUST™ cable clamping adapter


	Order no. black	Clamping range		Fits to multiple holder BGPM & reduction BGPMR (NW)	Depth (mm)	PU (pcs)
		1 fold BGPM & BGMPR	2, 3 & 4 fold BGPM & BGMPR*			
	BGPMK-10/7-3	7-3	6-4	10	30.0	5
	BGPMK-12/9-5	9-5	8-6	12	30.0	5
	BGPMK-17/15-11	15-11	14-12	17	30.0	5
	BGPMK-17/12-8	12-8	11-9	17	30.0	5
	BGPMK-23/20-16	20-16	19-17	23	30.0	5
	BGPMK-23/18-14	18-14	17-15	23	30.0	5
	BGPMK-29/25-21	25-21	24-22	29	30.0	5
	BGPMK-29/22-18	22-18	21-19	29	30.0	5
	BGPMK-36/34-30	34-30	33-31	36	30.0	5
	BGPMK-36/31-27	31-27	30-28	36	30.0	5
	BGPMK-36/28-24	28-24	27-25	36	30.0	5
	BGPMK-48/46-42	46-42	45-43	48	30.0	5
	BGPMK-48/43-39	43-39	42-40	48	30.0	5
	BGPMK-48/40-36	40-36	39-37	48	30.0	5
	BGPMK-48/37-33	37-33	36-34	48	30.0	5

\*We recommend to use cable with the slight reduced clamping range to ensure both optimum cable clamping as well as pre-assembly  
Cable clamping adapters for BGPM Multiple Holders and BGPMR reduction half-shells for supporting and holding cables  
Provides axial strain relief for cables  
Flexible configuration in multiple holders & reductions possible  
Easy installation

## System supports, half-shells


### Type VH & GN

#### Type VH - System support

	Order no. support ①	Order no. clip ①	Order no. complete ①	Fits to conduit size NW	Width x Height x Depth (mm)	Fixing screws	PU (pcs)
	BVH-17-010	BVH-17-020	BVH-17-000	17	35 x 36 x 36	6 x M5	100
	BVH-23-010	BVH-23-020	BVH-23-000	23	35 x 44 x 36	6 x M5	100
	BVH-29-010	BVH-29-020	BVH-29-000	29	46 x 52 x 40	6 x M5	100
	BVH-36-010	BVH-36-020	BVH-36-000	36	53 x 58 x 60	6 x M5	100
	BVH-48-010	BVH-48-020	BVH-48-000	48	66 x 72 x 60	6 x M5	60

For applications in machine building and installation  
 Optimal axial strain relief due to integrated rib  
 Variable fixation possible due to six holes, safe against turning  
 With safety lid suitable for overhead installation  
 High retention forces  
 PA 6

#### Type GN - Half shell

	Order no. fine profile, black	Order no. coarse profile, black	Order no. fine and coarse profile, black	Fits to conduit size NW	Outside Ø (mm)	Width (mm)	PU (pcs)
	BGN-S12T	–	–	12	26.5	34.0	50
	–	–	BGN-S17GT	17	32.0	34.0	50
	BGN-S23T	BGN-S23G	–	23	39.5	34.0	30
	–	–	BGN-S29GT	29	47.0	34.0	30
	–	–	BGN-S36GT	36	55.0	34.0	20
	BGN-S48T	BGN-S48G	–	48	66.5	34.0	20
	–	BGN-S70G	–	70	93.5	38.0	10


For conduit fixation in conjunction with beam systems, particularly in traction and machine applications  
 Fixes conduit against axial movements  
 Allows radial turning of conduit  
 Especially suitable for dynamic applications due to rounded edges  
 PA 6

① Please replace "B" for black with "S" for grey in front of the order no.

## System supports, rails for system supports


### Type FH-0, FHS & GPS

#### Type FH-0 - System support, one-piece

	Order no. black	Order no. grey	Fits to conduit size NW	Width x Height x Depth (mm)	Fixing screws	PU (pcs)
	BFH-07-0	SFH-07-0	07	17.0 x 21.5 x 20.0	1 x M4	100
	BFH-10-0	SFH-10-0	10	20.5 x 24.5 x 20.0	1 x M5	100
	BFH-12-0	SFH-12-0	12	24.0 x 27.0 x 20.0	1 x M5	100
	BFH-17-0	SFH-17-0	17	30.0 x 34.0 x 20.0	1 x M6	100
	BFH-23-0	SFH-23-0	23	38.5 x 42.0 x 20.0	1 x M6	100
	BFH-29-0	SFH-29-0	29	45.5 x 48.0 x 20.0	1 x M6	100
	BFH-36-0	SFH-36-0	36	55.5 x 56.0 x 20.0	1 x M6	50
	BFH-48-0	SFH-48-0	48	67.5 x 68.0 x 20.0	1 x M6	20


For applications in machine building and installation  
 Optimal axial strain relief due to integrated rib  
 Suitable for overhead installations due to safety lid  
 High retention forces  
 Quick mounting due to single hole fixing  
 Fits to rail for system support FHS  
 PA 6

#### Type FHS - Rail for system support

	Order no. black	Order no. grey	Fits to system supports	Length x Height x Depth (mm)	PU (pcs)
	BFHS-00	SFHS-00	FH-NW-0	275.0 x 15.5 x 25.0	10
	Additional position supports or distance spacers				
	BFHS-PH	SFHS-PH	Position support with screws		20
	BFHS-PH1	SFHS-PH1	Distance spacers		100

For flexible assembly of one-piece system supports and/or fixation of various conduit sizes  
 Glass fibre reinforced polyamide 6  
 Extremely robust construction  
 High stiffness  
 Positioning and distance spacers available  
 Glass fibre reinforced PA6

#### Type GPS - System support, one-piece, stackable

	Order no. black	Fits to conduit size NW	Width (mm)	Height (mm)	Depth (mm)	PU (pcs)
	BGPS-12/01*	12	70.0	51.0	30.0	30
	BGPS-17	17	70.0	51.0	30.0	30
	BGPS-23	23	70.0	51.0	30.0	30
	BGPS-29	29	85.0	65.0	30.0	20
	BGPS-36	36	85.0	65.0	30.0	10
	BGPS-48	48	115.0	92.5	30.0	10
	BGPS-56	56	115.0	92.5	30.0	10

\*This size will be delivered with a half-shell insert

In railway vehicle construction, heavy machine building industry and other applications with increased mechanical requirements

Heavy design, high retention forces. Applicable with standard metal C rails

Clasp for easy pre-mounting and final assembly. Especially suitable for dyn. applic. due to rounded edges

The following nominal widths can be combined for stacking: NW 12 with NW 17 + 23, NW 17 with NW 23,

NW 29 with NW 36, NW 48 with NW 56


Content of delivery: System support and 2 screws for securing of the lid (optional); without mounting accessories

PA 6

## Tube clamps


### Type GL & GH

#### Type GL - Tube clamp, one-piece

	Order no. black	Fits to conduit size NW	Width (mm)	Fixing screws	PU (pcs)
	BGL-07	07	25.0	1 x M4	100
	BGL-10	10	27.0	1 x M4	100
	BGL-12	12	31.0	1 x M4	100
	BGL-17	17	39.5	1 x M5	100
	BGL-23	23	49.0	1 x M5	100
	BGL-29	29	57.0	1 x M6	100

Used in general machine and installation applications  
 Integrated rib provides axial strain relief  
 Allows turning of the conduit, thus avoiding torsion stresses  
 Pre-fixation on the conduit possible  
 PA 6

#### Type GH - Tube clamp, one-piece


	Order no. black	Thread outside NW	Width (mm)	Fixing screws	PU (pcs)
	BGH-23	23	16.0	2 x M5	50
	BGH-29	29	19.0	2 x M6	50
	BGH-36	36	24.0	2 x M6	50
	BGH-48	48	24.0	2 x M6	50
	BGH-56	56	26.0	2 x M8	10
	BGH-70	70	30.0	2 x M8	10
	BGH-95	95	30.0	2 x M8	10

Used in general machine and installation applications  
 Integrated rib provides axial strain relief  
 Allows turning of the conduit, thus avoiding torsion stresses  
 Pre-fixation on the conduit possible  
 Allows solid fixation with 2 screws  
 PA 6

## Tube clamps


### Type SGB & SGS

#### Type SGB - Tube clamp

	Order no. black	Fits to conduit size NW	Width (mm)	Fixing screws	PU (pcs)
	SGB-07	07	13.0	1 x M4	100
	SGB-09	10	13.0	1 x M4	100
	SGB-11	12	13.0	1 x M4	100
	SGB-16	17	16.0	1 x M5	100
	SGB-21	23	16.0	1 x M5	50
	SGB-29	29	19.0	1 x M6	30
	SGB-36	36	19.0	1 x M6	20
	SGB-48	48	19.0	1 x M6	20

For fixation of static conduits  
Galvanized steel  
Elastomer profile (EPDM) free from halogens  
Smooth connection to PMA conduits  
Good resistance to ozone and ageing  
Temperature range: -40°C to +120°C

#### Type SGS - Tube clamp

	Order no. black	Fits to conduit size NW	Width x Height x Depth (mm)	Fixing screws	PU (pcs)
	SGS-36	36	80.0 x 48.0 x 19.0	2 x M6	20
	SGS-48	48	94.0 x 58.0 x 19.0	2 x M6	20
	SGS-56	56	118.0 x 72.0 x 24.0	2 x M8	10
	SGS-70	70	130.0 x 85.0 x 24.0	2 x M8	10
	SGS-95	95	156.0 x 110.0 x 24.0	2 x M8	10
	SGS-125	125	200.0 x 152.0 x 24.0	2 x M8	10

For fixation of static conduits  
Galvanized steel  
Elastomer profile (EPDM) free from halogens  
Smooth connection to PMA conduits  
Good resistance to ozone and ageing  
Temperature range: -40°C to +120°C  
Galvanized steel/EPDM

# PMA JUMBO sizes

## General technical details

Larger sizes for big solutions. When you need conduits with larger sizes for your cable protection, we provide you with a comprehensive selection of large size conduits including fittings and flanges.

—  
\* All conduits are REACH and RoHS compliant

The PMA JUMBO product line includes a range of large size cable protection products. Seven different conduit types using a variety of raw materials, to provide optimal performance in various applications and compatible fittings.

- PMA JUMBO conduits polyamide and polyurethane conduits in the large nominal width sizes NW56, 70, 95, 125 (PA6 conduits – PCL, CYL, VCS, VOH) (PA12 conduits – PIS) (PU conduits – PUE)
- PMAGRIP flange and threaded fittings plus accessories BGG (straight), BGO (90°) flange fittings achieve a sealing rating of IP50 and IP65 with a conduit sealing ring BGGV (straight), BGOV (90°) flange fittings achieve a sealing rating of IP68

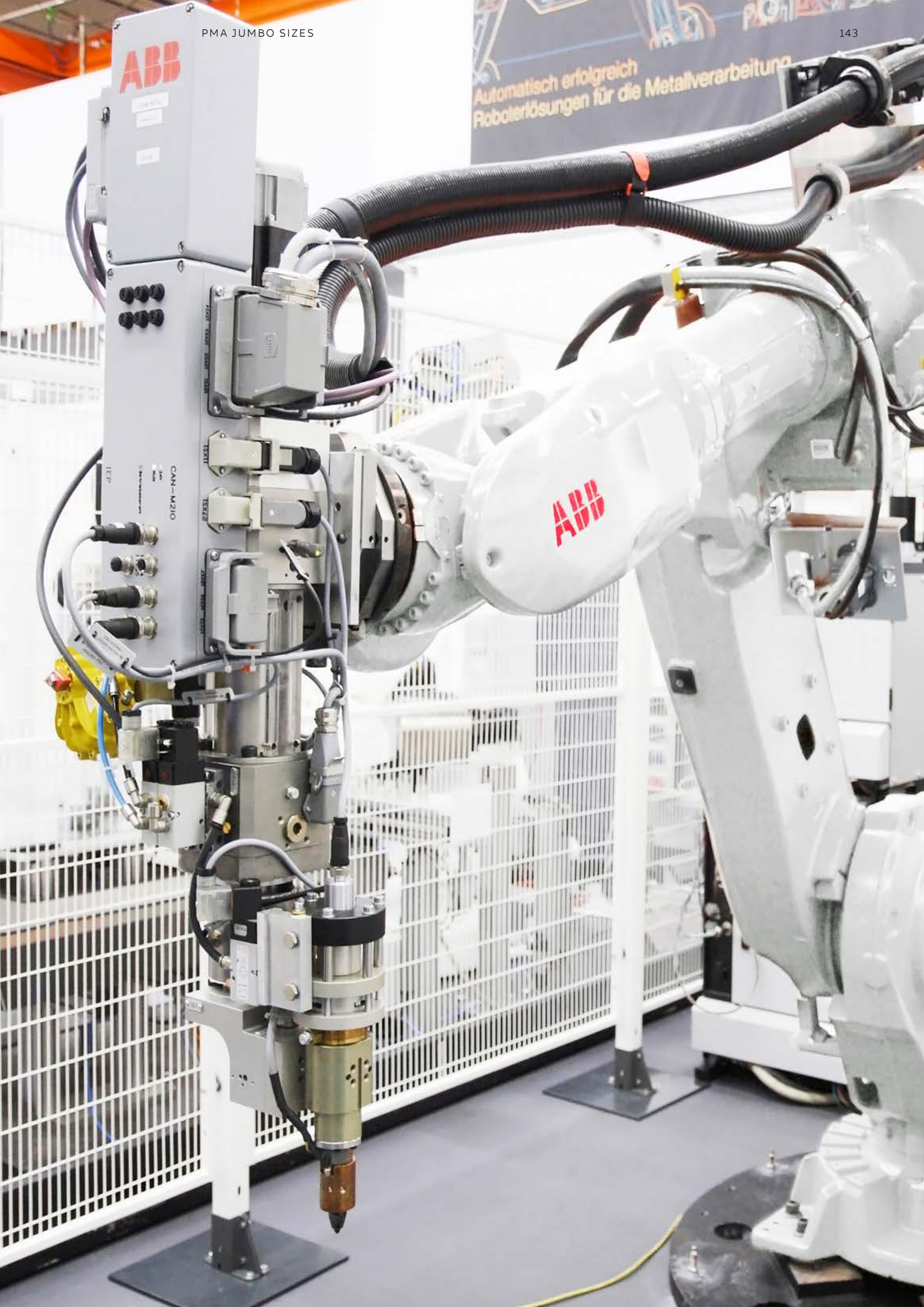
### Material

- Conduits made from specially formulated PA6, PA12 and PU
- Fittings made from specially formulated polyamide 6
- Self-extinguishing
- Free from halogens, REACH + RoHS compliant\*
- Very good chemical properties
- Temperature range:  
PA6 -40°C to +105°C, short-term to +160°C  
PA12 -40°C to +95°C, short-term to +150°C  
PU -60°C to +50°C

### Characteristics

- Excellent conduit pull-out strength
- High impact resistance
- All PMA Jumbo conduits have a coarse (G) profile
- The conduit types PIS and VCS are UL recognized in jumbo sizes for use with the flange type fittings.






## Conduits, large sizes

### Type PMAFLEX JUMBO conduits

#### Type PMAFLEX JUMBO conduits

	Order no. black	Order no. grey	Conduit size NW	Inside Ø (mm)	Outside Ø (mm)	Stat./Dyn. radius (mm)	PU (m)
PMAFLEX JUMBO conduits	PCLG-56B.30	PCLG-56S.30	56	56.3	67.2	130/-	30
	PCLG-70B.10	PCLG-70S.10	70	67.5	80.0	160/-	10
	PCLG-95B.10	PCLG-95S.10	95	91.5	106.0	210/-	10
	PCLG-125B.06	PCLG-125S.06	125	126.5	146.5	450/-	6
	PIHG-56B.30	PIHG-56S.30	56	56.3	67.2	110/270	30
	PIHG-70B.30	PIHG-70S.30	70	67.2	79.6	150/350	30
	PIHG-95B.30	PIHG-95S.30	95	91.3	106.0	170/450	30
	PIHG-125B.20	PIHG-125S.20	125	126.5	146.5	350/480	20
c R US	VCSG-56B.30	VCSG-56S.30	56	56.1	67.2	150/-	30
	VCSG-70B.10	VCSG-70S.10	70	66.5	80.0	200/-	10
	VCSG-95B.10	VCSG-95S.10	95	91.0	106.0	300/-	10
	LLPAG-56A.30	LLPAG-56S.30	56	56.3	67.2	120/-	30
	LLPAG-70A.10	LLPAG-70S.10	70	68.0	80.0	160/-	10
	LLPAG-95A.10	LLPAG-95S.10	95	91.9	106.0	210/-	10
	LLPAG-125A.06	LLPAG-125S.06	125	126.5	146.5	450/-	6
	VOHG-56B.10	VOHG-56S.10	56	55.5	67.2	135/-	10
	VOHG-70B.10	VOHG-70S.10	70	67.0	80.0	200/-	10
	VOHG-95B.10	VOHG-95S.10	95	90.5	106.0	300/-	10
	VOHG-125B.06	VOHG-125S.06	125	126.0	146.5	480/-	6
Approvals	PUEG-56B.30	-	56	56.3	67.2	90/170	30
	PUEG-70B.30	-	70	68.2	80.5	100/220	30


For further conduits and other sizes see conduit guide



# PMAGRIP flange fittings

## Type GG & GO

### Type GG - Flange straight fitting IP65


	Order no. black	Order no. grey	Fits to conduit size NW	Width (mm)	Height (mm)	Depth (mm)	PU (pcs)
	BGG-56	SGG-56	56	82.0	97.0	42.0	10
	BGG-70	SGG-70	70	97.0	114.0	48.0	10
	BGG-95	SGG-95	95	126.0	146.0	53.0	10
	BGG-125	SGG-125	125	-	Ø 194.0	79.0	5

#### Approvals



Ingress protection: IP50 without conduit seal ring (IP65 with conduit seal ring)  
 Flange seal FGO4 made from EPDM, standard for indoor and outdoor applications  
 Flange seal FGO4/01 made from NBR, optional for indoor applications with special chemical requirements  
 Temperature range with FGO4: -40°C to +105°C  
 Temperature range with FGO4/01: -25°C to +70°C  
 Content of delivery: Flange part, fixation clamps (incl. 2 screws), flange seal (FGO4 or FGO4/01), conduit seal ring (optional for IP65)

### Type GO - Flange 90° elbow fitting IP65

	Order no. black	Order no. grey	Fits to conduit size NW	Width (mm)	Height (mm)	Depth (mm)	PU (pcs)
	BGO-56	SGO-56	56	82.0	97.0	101.0	10
	BGO-70	SGO-70	70	97.0	114.0	115.0	10
	BGO-95	SGO-95	95	126.0	146.0	149.0	10

#### Approvals



Ingress protection: IP50 without conduit seal ring (IP65 with conduit seal ring)  
 Flange seal FGO4 made from EPDM, standard for indoor and outdoor applications  
 Flange seal FGO4/01 made from NBR, optional for indoor applications with special chemical requirements  
 Temperature range with FGO4: -40°C to +105°C  
 Temperature range with FGO4/01: -25°C to +70°C  
 Content of delivery: Flange part, fixation clamps (incl. 2 screws), flange seal (FGO4 or FGO4/01), conduit seal ring (optional for IP65)

## PMAGRIP flange fittings

### Type GGV & GOV

#### Type GGV - Flange straight fittings IP65

	Order no. black, IP68	Fits to conduit size NW	Width (mm)	Height (mm)	Depth (mm)	PU (pcs)
GGV	BGGV-56	56	82.0	97.0	42.0	10
	BGGV-70	70	97.0	114.0	48.0	10
	BGGV-95	95	126.0	146.0	53.0	10



#### Approvals



In railway vehicle construction as well as in a wide range of industrial applications with high sealing and safety requirements  
 Flange seal FGO4 made from EPDM, standard for indoor and outdoor applications  
 Flange seal FGO4/01 made from NBR on request, optional for indoor applications with special chemical requirements  
 Ingress protection: IP68, IP69 with conduit sealing NVN3  
 Temperature range with FG04: -40°C to +105°C  
 Temperature range with FG04/01: -25°C to +70°C

#### Type GOV - Flange 90° elbow fittings

	Order no. black, IP68	Fits to conduit size NW	Width (mm)	Height (mm)	Depth (mm)	PU (pcs)
GOV	BGOV-56	56	82.0	97.0	101.0	10
	BGOV-70	70	97.0	114.0	115.0	10
	BGOV-95	95	126.0	146.0	149.0	10



#### Approvals



In railway vehicle construction as well as in a wide range of industrial applications with high sealing and safety requirements  
 Flange seal FGO4 made from EPDM, standard for indoor and outdoor applications  
 Flange seal FGO4/01 made from NBR on request, optional for indoor applications with special chemical requirements  
 Ingress protection: IP68, IP69 with conduit sealing NVN3  
 Temperature range with FG04: -40°C to +105°C  
 Temperature range with FG04/01: -25°C to +70°C  
 If the application temperature is above 70°C we rec. to use an additional internal conduit support sleeve (BES)

## PMAGRIP threaded fittings, Conduit seal ring

### Type GG & SG03

#### Type GG - Straight fitting with locking clamps, metric, IP65

	Order no. black	Thread	Fits to conduit size NW	Thread length (mm)	Outside Ø (mm)	Overall length (mm)	PU (pcs)
GG	BGG-M6356	M63 x 1.5	56	18.0	98.0	57.5	10



Ingress protection: IP50 without conduit seal ring (IP65 with conduit seal ring)  
 Content of delivery: Threaded part, fixation clamps (incl. 2 screws), conduit seal ring (optional for IP65)

#### Type SG03 - Conduit seal ring

	Order no.	Fits to conduit size NW	Inside Ø (mm)	Outside Ø (mm)	Thickness (mm)	PU (pcs)
SG03	SG03-56.10	56	49.5	61.0	1.5	10
	SG03-70.10	70	61.5	74.0	1.5	10
	SG03-95.10	95	86.0	102.0	1.5	10
	SG03-125.10	125	122.0	142.0	2.0	10



Used at the conduit end for sealing between the PMAGRIP flanges GG/GO/GI and PMA JUMBO conduits  
 Nitrile rubber NBR  
 Temperature range: -40°C to +105°C

# Robotics & Automation

## Robotic accessories

PMA® cable protection system for Automation has been developed to protect cables and wires in extreme automation and robotic installations.



Through different conduit types for various requirements, system supports and a range of special accessories, torsion can be avoided and the stresses upon the cables reduced to a minimum. Special conduit designs, supports and abrasion protection sleeves provide optimal protection along the entire length of all moving elements, enabling engineers to achieve a massive reduction in torsion forces.

### Material

- Specially formulated polyamide 6
- Free from halogens, REACH + RoHS compliant
- Temperature range: -40 °C to +105 °C, short term to +160 °C

### Characteristics

- Reduce wear to guidance and control elements
- Increase the degree of freedom of robotic installations
- Allow optimal layout of cables along moving elements
- Increase the lifetime of moving installations
- Allow quick and easy installation



### Tube clamps, ball-joints, and half shell inserts

The range includes the BSH tube clamp, which serves as a fixation for functional inserts. The BTK ball joint sleeve offers additional flexibility and reduces mechanical stress on the conduit. BSSK ball joint half shells provide additional freedom of movement for corrugated conduits fixed in BSH automation tube clamps.






#### **Abrasion sleeves and other accessories**

Accessories include the BSS-OS screwless abrasion protection sleeve, providing abrasion protection for corrugated conduits in positions exposed to chafing. The BKS cable stars are tailored and designed-to-order.

## Tube clamps

### Type BSH

#### Type BSH - Tube clamp, one-piece

	Order no. black	Fits to conduit size NW	Width x Height x Depth (mm)	PU (pcs)
	BSH-R23	23	63.3 x 60.5 x 26.0	30
	BSH-R29	29	70.3 x 67.0 x 26.0	30
	BSH-R36	36	81.6 x 77.5 x 26.0	20
	BSH-R48	48	95.8 x 91.0 x 26.0	20
	BSH-R56	56	112.6 x 109.8 x 30.0	20
	BSH-R70	70	148.0 x 142.5 x 39.5	20

In automation applications for guiding or fixing PMA conduits

Single-piece, robust construction

Easy installation, fixation via PT-screw


Combination with different inserts possible (e.g. BGN half-shells)

Material: High-grade, specially formulated polyamide 6

## Half shell inserts, heavy duty swivel base


Type BGN & DKLK

### Type BGN - Half shell inserts

	Order no. slide, black	Order no. strain relief, black	Conduit profile	Fits to conduit size NW	Outer diameter x height	Fits to	PU (pcs)	
	BGN-R29	-	-	29	47.0 x 34.0	BSH-R29	30	
	BGN-R36	-	-	36	55.0 x 34.0	BSH-R36	20	
	BGN-R48	-	-	48	66.5 x 34.0	BSH-R48	20	
	BGN-R56	-	-	56	81.0 x 38.0	BSH-R56	10	
	BGN-R70	-	-	70	103.5 x 45.0	BSH-R70	10	
	-	BGN-S29GT		G+T	29	47.0 x 34.0	BSH-R29	30
	-	BGN-S36GT		G+T	36	55.0 x 34.0	BSH-R36	20
	-	BGN-S48T		T	48	66.5 x 34.0	BSH-R48	20
	-	BGN-S48G		G	48	66.5 x 34.0	BSH-R48	20
	-	BGN-S56G		G	56	81.0 x 38.0	BSH-R56	10
	-	BGN-S70G*		G	70	103.5 x 45.0	BLH-R70G	10

Half shell inserts for BSH and BLH tube clamp  
 Glide half-shells allow axial movement of the conduit, reducing stress  
 Strain relief half-shells fix the conduit against axial movement but allow rotation to prevent torsion  
 Material: High-grade, specially formulated polyamide 6  
 \* BGN-R70G is only compatible with the BSH-R70

### Type DKLK - Heavy duty swivel base


	Order no. black	Fits to	Dimensions		Base fixation screws	PU (pcs)
			Base (mm)	Swivel (Ømm)		
	DKLK-R56x56	BSH-R29 / -R36 / -R48	56 x 56	40	M6	1
	DKLK-R100x80	BSH-R56 / BSH-R70	100 x 80	72	M8	1

Sealed high quality bearing with minimal play  
 Allows rotation of cable pack supports  
 Easy installation of BSH tube clamp on bearing with center screw  
 Suitable for high mechanical forces in all assembly positions  
 Possible to block rotation with a cylinder pin (included in BSH tube clamp)  
 Material: Black anodized aluminum

## Ball-joint sleeve, strain relief insert


Type BTK & BTR

### Type BTK - Ball-joint sleeve

	Order no. glide, black	Order no. strain relief, black	Fits to conduit size NW	Trumpet diameter x height (mm)	Fits to	PU (pcs)
	BTK-R36	BTK-R36 + BTR-R36GT	36	66.0 x 104.0	BSH-R48	1
	BTK-R48	BTK-R48 + BTR-R48GT	48	79.5 x 110.0	BSH-R56	1
	–	BTK-R70 + BTR-R70G + BGN-R56G/70G	56	121.0 x 138.5	BSH-R70	1
	BTK-R70	BTK-R70 + BTR-R70G	70	121.0 x 138.5	BSH-R70	1

\* Reduction half-shell BGN-R56G/70G required to ensure usage for NW56 size conduit  
 Ball joint sleeve allows fixation and mechanical guidance of PMA conduits  
 Mostly used in combination with BSH tube clamps  
 Suited for robotics dress pack installations  
 Trumpet-shaped openings restricts conduit bending radius, increasing conduit lifetime  
 Combination with strain relief insert (BTR) allows to block axial conduit movement/sliding  
 Material: High-grade, specially formulated polyamide 6

### Type BTR - Strain relief insert fits to BTK-R

	Order no. black	Fits to conduit size NW	Diameter x height (mm)	Fits to	PU (pcs)
	BTR-R36GT	36	49.5 x 27.5	BTK-R36	1
	BTR-R48GT	48	61.5 x 31.5	BTK-R48	1
	BTR-R70G	70	91.0 x 24.5	BTK-R70	1


Strain relief insert for BTK-R  
 Allows to block axial conduit movement/sliding  
 Material: High-grade, specially formulated polyamide 6



## Ball-joint termination, ball-joint half shells

### Type BKE & BSSK

#### Type BKE - Ball-joint termination

	Order no. black	Fits to conduit size NW	Trumpet diameter x height (mm)	Fits to	PU (pcs)
	BKE-R36GT	36	65.0 x 85.0	BSH-R36	1
	BKE-R48GT	48	78.5 x 90.0	BSH-R48	1
	BKE-R70G*	56	122.0 x 126.5	BSH-R70	1
	BGN-R56	70	122.0 x 126.5	BSH-R70	1

\* Reduction half-shell BGN-R56G/70G required to ensure usage for NW56 size conduit

Ball joint termination allows fixation of a PMA conduit terminal


Mostly used in combination with BSH tube clamps

Suited for robotics dress pack installations, e.g. end piece of conduit at robot axis 6

Additional strain relief possible in combination with the BKS cable star

Material: High-grade, specially formulated polyamide 6

#### Type BSSK- Ball-joint half shells

	Order no. black	Fits to conduit size NW	Outer diameter x height (mm)	Fits to	PU (pcs)
	BSSK-23GT	23	42.2 x 27.0	BSH-R23	20
	BSSK-29GT	29	48.1 x 28.0	BSH-R29	20
	BSSK-36GT	36	55.0 x 30.0	BSH-R36	20
	BSSK-48GT	48	65.9 x 30.0	BSH-R48	20
	BSSK-56G	56	80.9 x 34.0	BSH-R56	20

Ball joint half shells allow fixation of PMA conduits

Mostly used in combination with BSH tube clamps


Ball joint design increases degree of freedom and reduces mechanical stress on conduit

Material: High-grade, specially formulated polyamide 6

## Screwless abrasion protection sleeve, gliding bush


Type BSS-OS & BFE

### Type BSS-OS - Screwless abrasion protection sleeve

	Order no. black	Fits to conduit size NW	Outer diameter x height (mm)	PU (pcs)
	BSS-36-OS	36	63.0 x 30.0	20
	BSS-48-OS	48	75.0 x 30.0	10
	BSS-70-OS	70	104.0 x 44.0	10

Increases lifetime of moving conduits in dynamic applications  
 No metal parts, no screws, tool-free installation  
 Easy (re-)positioning without full disassembly  
 Fits both conduit profiles - fine (T) and coarse (G)  
 Material: High-grade, specially formulated polyamide 6

### Type BFE- Gliding bush


	Order no. black	Fits to conduit size NW	Diameter x height (mm)	PU (pcs)
	BFE-R70	70	102.5 x 77.5	18

Mostly used in combination with SH tube clamp  
 Used as termination for springs in a pull-back/retraction system  
 Allows easy gliding of the conduit  
 Material: High-grade, specially formulated polyamide 6

## Cable star, cable star holder, conduit marking ring


Type BKS, BGS & XMR

### Type BKS - Cable star / Type BGS - Cable star holder

	Order no. black	Type	Fits to conduit size NW	Diameter x width (mm)	Fits to
	BKS-R36/V*	Cable star	36	20 x 42	BKE-R36GT
	BKS-R48/V*	Cable star	48	20 x 53	BKE-R48GT
	BKS-R70/V*	Cable star	70	83 x 20	BKE-R70G BGS-R70
	BGS-R70	Cable star holder	70	-	BKS-R70/V* BSH-R70

\* BKS cable star is a non-standard product and will be tailor made to customer specific needs  
 BKS cable star is used for arrangement and slight strain relief of cables & tubes inside a PMA conduit  
 Fixation via dedicated half shells (BGS-R70), or via BKE  
 Customer specific design with minimum order quantity

### Type XMR - Conduit marking ring

	Order no. red	Order no. yellow	Order no. white	Fits to conduit size NW	Outer diameter (mm)	PU (pcs)
	XMR-NW48R	-	-	48	53.5	100
	XMR-NW70R	-	-	70	78.0	100
	-	XMR-NW48Y	-	48	53.5	100
	-	XMR-NW70Y	-	70	78.0	100
	-	-	XMR-NW48W	48	53.5	100
	-	-	XMR-NW70W	70	78.0	100

Marking for PMA conduits  
 Extremely shock resistant  
 Cut the ring to assemble to conduit corrugations

# PMA® CobotProtect™

## Accessories for collaborative robots

PMA® CobotProtect™ cable protection solution for collaborative robots (cobots) is designed to safely work directly and continuously alongside humans and to be very easy to install and use.

The PMA CobotProtect™ has been pre-engineered as a complete kit including XTPC multilayer conduit, BCCH conduit holder and BCSR strain relief ring. The highly flexible PMA® CobotProtect™ CobotKit with Velcro strap (included) and Ty-Rap® cable ties (optional) for fixation, incorporates features which ensures to compatibility with most widely used collaborative robot on the market.





## PMA CobotProtect™ kit / CobotKit+

### Type KIT-CCH

#### Type KIT-CCH - PMA CobotProtect™ kit

	Order no. black	Fits to conduit size NW	Conduit part no. XTPC	Conduit holder part no. BCCH	Strain relief part no. BCSR	Kit contents	
						Strain relief holder part no. BFH-0	PU (pcs)
KIT-CCH	KIT-CCH-17	17	XTPCG-17BB.3	BCCH-17	BCSR-17	BFH-23-0	1
	KIT-CCH-23	23	XTPCG-23BB.3	BCCH-23	BCSR-23	BFH-29-0	1
	KIT-CCH-29	29	XTPCG-29BB.3	BCCH-29	BCSR-29	BFH-36-0	1



PMA CobotProtect kit as easy-to-use dress pack solution for collaborative robots

Kit includes conduit holders (x2), strain relief ring (incl. holder) & 3 metres of XTPC multilayer conduit with wear indication function

Flexible holder base ensures compatibility with most cobot models of widely used brands (e.g. ABB™, UR™, Omron™, etc.)

Installation with Velcro® for cylindrical arm diameter 56mm - 120mm

#### Type KIT-CCH+ - PMA CobotProtect™ CobotKit+

	Order no. black	Fits to conduit size NW	Conduit part no. XTPC	Conduit holder part no. BCCH	Strain relief part no. BCSR	Kit contents	
						Strain relief holder part no. BFH-0	PU (pcs)
KIT-CCH+	KIT-CCH-17/01	17	XTPCG-17BB.4	BCCH-17/01	BCSR-17	BFH-23-0	1
	KIT-CCH-23/01	23	XTPCG-23BB.4	BCCH-23/01	BCSR-23	BFH-29-0	1
	KIT-CCH-29/01	29	XTPCG-29BB.4	BCCH-29/01	BCSR-29	BFH-36-0	1



PMA CobotProtect kit as easy-to-use dress pack solution for collaborative robots

Kit includes conduit holders (x4) incl. 700mm Velcro®, strain relief ring (incl. holder) & 4 metres of XTPC multilayer conduit with wear indication function


Flexible holder base ensures compatibility with most cobot models of widely used brands (e.g. ABB™, UR™, Omron™, etc.)

Installation with Velcro® for cylindrical arm diameter 56mm - 120mm

## PMA CobotProtect™ conduit holder, strain relief ring, CobotClamp


Type BCCH, BCSR, EOA

### Type BCCH - PMA CobotProtect™ conduit holder

	Order no. black	Fits to conduit size NW	Velcro® length (mm)	For robotic arms dia. (mm)		PU (pcs)
				Min	Max	
	BCCH-17	17	500	56.0	370.0	1
	BCCH-23	23	500	56.0	370.0	1
	BCCH-29	29	500	56.0	370.0	1
	BCCH-17/01	17	700	56.0	370.0	1
	BCCH-23/01	23	700	56.0	370.0	1
	BCCH-29/01	29	700	56.0	370.0	1


For fixing PMA conduits along a variety of cylindrical & elliptical shaped collaborative robot (cobot) arms  
Flexible design of swivel base ensures compatibility with cobot models of most widely used brands (e.g. ABB™, UR™, Omron™, etc.)  
Fastening along cobot arm with Velcro® and/or cables ties  
360° swiveling of BFH-0 clip gives flexibility and reduces mechanical stress induced by cobot movements  
10° tilt angle of FH-clip in any direction

### Type BCSR - PMA CobotProtect™ strain relief ring

	Order no. black	Fits to conduit size NW	Fits to	Strain relief teeth (Qty)	PU (pcs)
	BCSR-23	23	BFH-29-0 BGPM-1X29	6	10
	BCSR-29	29	BFH-36-0 BGPM-1X36	6	10

In automation applications to relieve strain and to fixate individual cables/tubes to a conduit terminal  
Fastening of individual cables/tubes to a conduit terminal via cable ties (not included)  
To be used freely rotating around conduit axis, or in "lock" mode using a BFH-0 or BGPM-1X  
Easy to install and to exchange

### Type EOA - PMA CobotProtect™ CobotClamp

	Order no.	Fits to conduit size NW	Compatible with	PU (pcs)
		23	BFH-23-0	
		29	BFH-29-0	
		36	BFH-36-0	

For collaborative robots (cobots) to fixate PMA CobotProtect™ – CobotKit & CobotKit+ at cobot end of arm (6th axis)  
Allows mounting of PMA CLIP – BFH-0 to fixate PMA conduit or PMA CobotProtect™ – Strain Relief  
Ensures fixed spacing at 6th axis between dress pack and end-of-arm tool  
Easy to install and assemble

# PMA Divisible System

## General technical details

One-piece Divisible System. The ideal solution for repairs, retrofit and pre-loomed applications. Equally all PMA conduits are compatible.

PMA offers a divisible system based upon PMA standard nominal widths.

This allows free combination of the PACOF and PPCOF divisible conduits with PMAFIX Pro, PMAFIX and PMA Smart Line fittings. Using the PMA Divisible System Fittings repairs can be easily made to existing installations without disconnecting cables. Equally all PMA conduits – also slit – are compatible with the fittings of the divisible system.

### Material

- Conduits made from spec. formulated PA 6 and Polypropylene
- Fittings made from specially formulated polyamide 6
- Colour: Black
- Free from halogens, REACH + RoHS compliant
- Temperature range:  
Conduits: -40°C to +160°C  
Fittings: -40°C to min. +105°C

### Characteristics

- Fast installation
- Conduit can be installed in fitting prior to closing the fitting
- High impact resistance
- High conduit pull-out strength
- Fits conduit profiles – fine (T) and coarse (G)








## Divisible conduits

### Type PACOF & PPCOF

#### Type PACOF - Flexible, divisible


	Order no. black	Fits to conduit size NW	Inside Ø (mm)	Outside Ø (mm)	Stat. radius (mm)	PU (m)
	PACOF-07B.50	07	5.6	10.0	30	50
	PACOF-10B.50	10	8.5	12.8	33	50
	PACOF-12B.50	12	11.0	15.6	35	50
	PACOF-17B.50	17	15.5	21.1	45	50
	PACOF-23B.50	23	22.1	28.4	70	50
	PACOF-29B.50	29	27.2	34.5	120	50
	PACOF-36B.30	36	32.0	42.4	145	30
	PACOF-48B.30	48	43.9	54.1	150	30
	PACOF-70B.10	70	62.0	79.0	190	10

#### PACOF Index

min.	max.
Ductility	
Fatigue reversed bending	
Compression resistance	
Low temperature performance	
Weathering resistance	

For machine building and plant construction  
 For trouble-free retrofitting and applicable for repairs  
 Specially modified polyamide 6  
 Can be opened and closed again in longitudinal direction any time  
 Good ductility  
 Good compression resistance  
 Free from halogens, REACH + RoHS compliant  
 Temperature range: -40°C to +105°C, short-term to +160°C  
 IP50

#### Type PPCOF - Flexible, divisible

	Order no. black	Fits to conduit size NW	Inside Ø (mm)	Outside Ø (mm)	Stat. radius (mm)	PU (m)
	PPCOF-07B.50	07	5.6	10.0	25	50
	PPCOF-10B.50	10	8.5	12.8	28	50
	PPCOF-12B.50	12	11.0	15.6	35	50
	PPCOF-17B.50	17	15.1	21.1	45	50
	PPCOF-23B.50	23	22.1	28.4	60	50
	PPCOF-29B.50	29	26.6	34.5	100	50
	PPCOF-36B.30	36	31.8	42.4	120	30
	PPCOF-48B.30	48	43.9	54.1	140	30
	PPCOF-70B.10	70	60.5	78.0	200	10

#### PPCOF Index


min.	max.
Ductility	
Fatigue reversed bending	
Compression resistance	
Low temperature performance	
Weathering resistance	

For machine building and plant construction  
 For trouble-free retrofitting and applicable for repairs  
 Specially modified polypropylene PP  
 Can be opened and closed again in longitudinal direction any time  
 Good reversed bending resistance  
 Temperature range: -20°C to +105°C, short-term to +150°C  
 IP50

## Divisible fittings, lock nuts

### Type LNO & LN

#### Type LNO - Divisible one-piece straight fitting, metric thread

	Order no. black	Thread metric	Fits to conduit size NW	Thread length (mm)	Overall length (mm)	PU (pcs)
	BLNO-M160	M16 x 1.5	10	13.0	37.5	50
	BLNO-M162	M16 x 1.5	12	13.0	39.5	50
	BLNO-M202	M20 x 1.5	12	13.0	39.5	50
	BLNO-M207	M20 x 1.5	17	13.0	43.5	50
	BLNO-M257	M25 x 1.5	17	14.0	44.5	50
	BLNO-M253	M25 x 1.5	23	14.0	52.5	30
	BLNO-M323	M32 x 1.5	23	17.0	56.0	30
	BLNO-M329	M32 x 1.5	29	17.0	61.0	20
	BLNO-M409	M40 x 1.5	29	21.0	65.0	20
	BLNO-M406	M40 x 1.5	36	22.0	74.5	20
	BLNO-M508	M50 x 1.5	48	22.0	80.5	10

Divisible one-piece straight fitting, metric thread

Compatible with PMA standard, slit and divisible conduits with standard nominal widths


In industries, plant construction, machine building as well as in house and electrical installations

For retrofit installation or repair

IP54

Special: Push-in installation of conduit into pre-installed fitting also possible

#### Type LN - Divisible lock nut, metric thread

	Order no. black	Thread metric	Fits with divisible fitting		Wrench size (mm)	PU (pcs)
	BLN-M16	M16 x 1.5	BLNO-M160	BLNO-M162	22.0	50
	BLN-M20	M20 x 1.5	BLNO-M202	BLNO-M207	26.0	50
	BLN-M25	M25 x 1.5	BLNO-M257	BLNO-M253	32.0	10
	BLN-M32	M32 x 1.5	BLNO-M323	BLNO-M329	41.0	10
	BLN-M40	M40 x 1.5	BLNO-M409	BLNO-M406	50.0	10
	BLN-M50	M50 x 1.5	BLNO-M508		60.0	10

Compatible with divisible PMA fittings, type BLNO


For retrofit installation or repair

Temperature range: -40°C to +100°C, short-term: +130°C

## T, Y pieces, splice fittings


### Type LTO & LYO

#### Type LTO - Divisible T piece, one-piece fitting

	Order no. black, IP40	3x conduit sizes		Width (mm)	Height (mm)	PU (pcs)
		NW				
	BLTO-070707	07		45.2	31.1	10
	BLTO-101010	10		45.2	31.1	10
	BLTO-121212	12		49.1	34.8	10
	BLTO-171717	17		56.6	41.0	10
	BLTO-232323	23		64.5	48.6	10
	BLTO-292929	29		72.0	55.3	10

Compatible with PMA standard, slit and divisible conduits with standard nominal widths  
 In industries, plant construction, machine building as well as in house and electrical installations  
 For retrofit installation or repair  
 IP40

#### Type LYO - Divisible Y piece, one-piece fitting


	Order no. black, IP40	1x conduit size	2x conduit sizes	Width (mm)	Height (mm)	PU (pcs)
		NW	NW			
	BLYO-100707	10	07	54.6	37.1	10
	BLYO-121010	12	10	54.9	39.8	10
	BLYO-171212	17	12	63.6	47.5	10
	BLYO-231717	23	17	76.5	60.0	10
	BLYO-292917	29	17	100.6	76.0	10

Compatible with PMA standard, slit and divisible conduits with standard nominal widths  
 In industries, plant construction, machine building as well as in house and electrical installations  
 For retrofit installation or repair  
 IP40  
 Conduit can be installed in fitting prior to closing the fitting

## T, Y pieces, splice fittings

### Type LSGO

#### Type LSGO - Divisible one-piece fitting

	Order no. black, IP40	Fits to conduit size NW	Overall length (mm)	Outer Ø (mm)	PU (pcs)
	BLSGO-1010	10	36	16	10
	BLSGO-1212	12	36	21	10
	BLSGO-1717	17	38	26	10
	BLSGO-2323	23	39	33	10

Compatible with PMA standard, slit and divisible conduits with standard nominal widths  
 In industries, plant construction, machine building as well as in house and electrical installations  
 For retrofit installation or repair  
 Polyamide (Nylon) 66  
 IP40 rated

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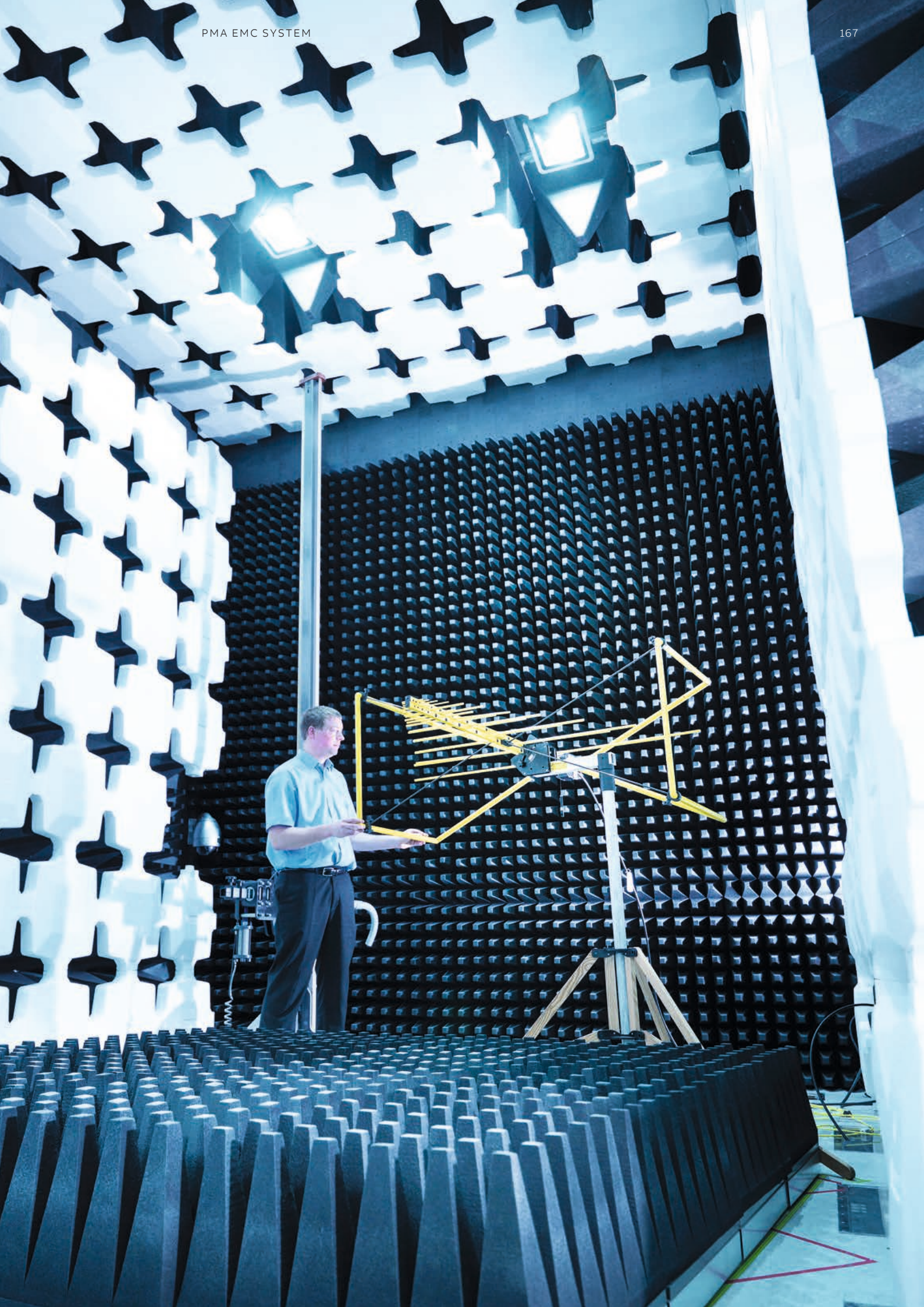
# PMA EMC System

## High-grade shielding protection

The PMA EMC System provides an additional function within the PMA Cable Protection System, offering high quality shielding against electro-magnetic signals over and above the mechanical cable protection.

The EMC product line includes screening braids (tin-plated copper and hybrid braids) and a range of patented termination fittings (metallic components in nickel plated aluminium or nickel plated brass). The EMC system can be combined with any type of PMA conduit to provide the mechanical protection.

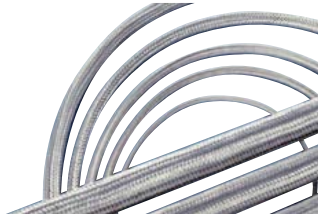




## PMA EMC System screening braid

Type F.CK, F.CU, F.HY

### Type F.CK - PMA EMC System screening braid


	Order no.	Braid specification	Operative range min. Ø (mm)	Operative range max. Ø (mm)	PU (pcs)
	F.CK.03	16 x 5 x 0.13	3.5	3.5	100
	F.CK.04	16 x 7 x 0.13	3.0	5.0	100
	F.CK.06	24 x 7 x 0.13	4.5	7.0	100
	F.CK.10	24 x 11 x 0.13	7.0	12.0	100
	F.CK.12.5	24 x 14 x 0.13	11.0	13.0	100
	F.CK.15	24 x 14 x 0.15	13.0	18.0	100
	F.CK.20	48 x 10 x 0.15	16.0	35.0	50
	F.CK.25	48 x 13 x 0.15	22.0	40.0	50
	F.CK.30	48 x 20 x 0.15	27.0	44.0	50
	F.CK.35	48 x 20 x 0.15	35.0	50.0	50
	F.CK.50	36 x 14 x 0.30	40.0	60.0	25

Typical screening values: 65 – 75 dB at 100 MHz

Surface coverage: >90%

Temperature range: -65°C to +150°C

### Type F.CU - PMA EMC System screening braid


	Order no.	Braid specification	Operative range min. Ø (mm)	Operative range max. Ø (mm)	PU (pcs)
	F.CU.01	16 x 4 x 0.10	1.0	3.0	100
	F.CU.04	24 x 7 x 0.10	3.0	8.0	100
	F.CU.10	24 x 11 x 0.10	4.0	10.0	100
	F.CU.12	36 x 11 x 0.10	6.0	15.0	100
	F.CU.20	36 x 8 x 0.15	12.0	25.0	100
	F.CU.40	48 x 7 x 0.25	24.0	49.0	50
	F.CU.50	48 x 9 x 0.30	45.0	55.0	25

Typical screening values: 60 – 70 dB at 100 MHz

Surface coverage: >65%

Temperature range: -65°C to +150°C

### Type F.HY - PMA EMC Hybrid screening braid, very flexible, lightweight

	Order no.	Braid specification	Operative range min. Ø (mm)	Operative range max. Ø (mm)	PU (pcs)
	F.HY.10*	48 x 8 x 0.1	8.0	13.0	50
	F.HY.12*	56 x 8 x 0.1	10.0	15.0	50
	F.HY.15	68 x 10 x 0.1	12.0	18.0	50
	F.HY.20	72 x 10 x 0.1	19.0	27.0	50
	F.HY.35	120 x 10 x 0.1	30.0	40.0	50
	F.HY.40	120 x 16 x 0.1	30.0	50.0	50

Typical screening values: 45 - 67 dB at 100 MHz

Surface coverage: >95%

Temperature range: -40°C to +150°C


\* with tube former



## PMA EMCFIX fittings

### Type BVEMV, BVEMV-SW

#### Type BVEMV / PMA EMCFIX - Straight fitting, metric metal thread, long and short

	Order no. black, IP68	Thread size Metric	Fits to conduit size NW	Fits to F.CK	Fits to F.CU	Fits to F.HY	Thread length (mm)	Overall length (mm)	PU (pcs)
	BVEMV-M120-5	M12 x 1.5	10	10	10	–	5.0	65.0	1
	BVEMV-M120-10	M12 x 1.5	10	10	10	–	10.0	70.0	1
	BVEMV-M162-5	M16 x 1.5	12	12.5	12	12	5.0	70.0	1
	BVEMV-M162-10	M16 x 1.5	12	12.5	12	12	10.0	75.0	1
	BVEMV-M207-6	M20 x 1.5	17	15	20	15	6.0	80.0	1
	BVEMV-M207-10	M20 x 1.5	17	15	20	15	10.0	84.0	1
	BVEMV-M253-7	M25 x 1.5	23	20/(25)	20	20	7.0	86.0	1
	BVEMV-M253-11	M25 x 1.5	23	20/(25)	20	20	11.0	90.0	1
	BVEMV-M329-8	M32 x 1.5	29	25/(30)	20/(40)	35	8.0	90.0	1
	BVEMV-M329-13	M32 x 1.5	29	25/(30)	20/(40)	35	13.0	95.0	1
	BVEMV-M409-13	M40 x 1.5	29	25/(30)	20/(40)	35	13.0	97.0	1
	BVEMV-M406-8	M40 x 1.5	36	30/(35)	40	40	8.0	100.0	1
	BVEMV-M406-13	M40 x 1.5	36	30/(35)	40	40	13.0	105.0	1
	BVEMV-M508-9	M50 x 1.5	48	35	40	40	9.0	105.0	1
	BVEMV-M508-14	M50 x 1.5	48	35	40	40	14.0	110.0	1
	BVEMV-M638-10	M63 x 1.5	48	35	40	40	10.0	106.0	1
BVEMV-M638-14	M63 x 1.5	48	35	40	40	14.0	110.0	1	

Very high impact resistance

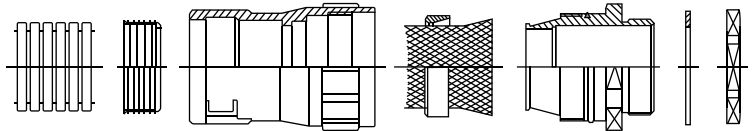
Vibration-proof connection to PMAFLEX conduits

High shielding values and low coupling resistance, low transfer impedances


Can be used with either PMA screening braids or shielded cables

Self-extinguishing, free from halogens and cadmium

Fits both conduit profiles - fine (T) and coarse (G)



#### Type BVEMV-SW / PMA EMCFIX - Straight fitting, metric metal thread, positionable

	Order no. black, IP68	Thread size Metric	Fits to conduit size NW	Fits to F.CK	Fits to F.CU	Fits to F.HY	Thread length (mm)	Overall length (mm)	PU (pcs)
	BVEMV-M207SW-10	M20 x 1.5	17	15	20	15	10.0	107.0	1
	BVEMV-M329SW-13	M32 x 1.5	29	25/(30)	20/(40)	35	13.0	124.0	1
	BVEMV-M406SW-13	M40 x 1.5	36	30/(35)	40	40	13.0	139.0	1
	BVEMV-M638SW-14	M63 x 1.5	48	35	40	40	14.0	146.5	1

Very high impact resistance

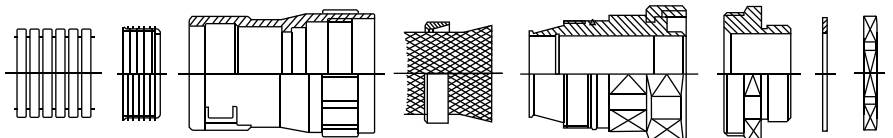
Vibration-proof connection to PMAFLEX conduits

High shielding values and low coupling resistance, low transfer impedances

Can be used with either PMA screening braids or shielded cables

Self-extinguishing, free from halogens and cadmium


Fits both conduit profiles - fine (T) and coarse (G)



## PMA EMC System fittings with female thread

### Type BVIMV

#### Type VIMV / PMA EMC System - Straight fitting, female UN thread for MIL-C5015

	Order no. black, IP68	Thread size UN	Fits to conduit size NW	Fits to F.CK	Fits to F.CU	Fits to F.HY	Thread length (mm)	Overall length (mm)	PU (pcs)
	BVIMV-U182	3/4" - 20	12	12.5	12	12	10.0	75.0	1
	BVIMV-U212	7/8" - 20	12	12.5	12	12	10.0	75.0	1
	BVIMV-U247	1" - 20	17	15	20	15	10.0	85.0	1
	BVIMV-U353	1 1/16" - 18	23	20/(25)	20	20	10.0	92.5	1
	BVIMV-U357	1 1/16" - 18	17	15	20	15	10.0	87.0	1
	BVIMV-U433	1 3/4" - 18	23	20/(25)	20	20	10.0	95.0	1
	BVIMV-U569	2 1/4" - 16	29	25/(30)	20/(40)	35	10.0	95.0	1
	BVIMV-U566	2 1/4" - 16	36	30/(35)	40	40	10.0	110.0	1
	BVIMV-U568	2 1/4" - 16	48	35	40	40	10.0	110.0	1

Very high impact resistance

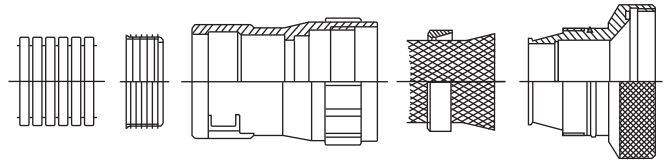
Vibration-proof connection to PMAFLEX conduits

High shielding values and low coupling resistance, low transfer impedances


Can be used with either PMA screening braids or shielded cables

Self-extinguishing, free from halogens and cadmium

Fits both conduit profiles - fine (T) and coarse (G)



#### Type VIMV / PMA EMC System - Straight fitting, female UNEF thread for MIL-C26482G

	Order no. black	Thread size UNEF	Fits to conduit size NW	Fits to F.CK	Fits to F.CU	Fits to F.HY	Thread length (mm)	Overall length (mm)	PU (pcs)
	BVIMV-U212-14	7/8" - 20	12	12.5	12	12	14.0	75.0	1
	BVIMV-U247-14	1" - 20	17	15	20	15	14.0	90.0	1
	BVIMV-U267-14	1 1/16" - 18	17	15	20	15	14.0	90.0	1
	BVIMV-U293-14	1 3/16" - 18	23	20	20	20	14.0	90.0	1
	BVIMV-U303-14	1 1/4" - 18	23	20	20	20	14.0	90.0	1
	BVIMV-U323-14	1 5/16" - 18	23	20	20	20	14.0	90.0	1
	BVIMV-U359-14	1 7/16" - 18	29	20	20	35	14.0	95.0	1

Very high impact resistance

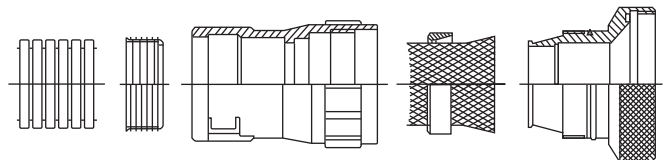
Vibration-proof connection to PMAFLEX conduits

High shielding values and low coupling resistance, low transfer impedances

Can be used with either PMA screening braids or shielded cables

Self-extinguishing, free from halogens and cadmium


Fits both conduit profiles - fine (T) and coarse (G)



## PMA EMC System adapter

### Type HFAK-M

Type HFAK-M - PMA EMC System adapter with conical braid clamp, metric thread

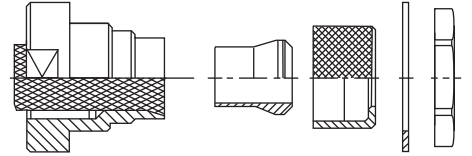
	Order no. black, IP68	Thread size metric		Fits to conduit size NW	Fits to F.CK	Fits to F.CU	Fits to F.HY	ID min.	Thread length (mm)	Overall length (mm)	PU
		1	2								
	HFAK-M20/M20-10	M20 x 1.5	M20 x 1.5	12	15	12/20	12/15	9.6	10.0	34.0	1
	HFAK-M25/M25-11	M25 x 1.5	M25 x 1.5	17	20	20	15/20	14.6	11.0	36.5	1
	HFAK-M32/M32-13	M32 x 1.5	M32 x 1.5	23	20/25	40	20	20.3	13.0	42.5	1
	HFAK-M40/M40-13	M40 x 1.5	M40 x 1.5	29	25/30	40	35/40	28.1	13.0	47.0	1
	HFAK-M50/M50-14	M50 x 1.5	M50 x 1.5	36	30/50	40	40	37.3	14.0	48.5	1
	HFAK-M63/M63-14	M63 x 1.5	M63 x 1.5	48	35/50	-	40	47.0	14.0	49.0	1

Low impedance braid connection

High system shielding attenuation in combination with F.CU, F.CK and F.HY

Disturbance signals such as electrical signals and magnetic fields will be discharged to the housing/casing


Allows complete pre-assembly of the cable loom



## PMA EMCFIX Pro EMC System fittings with strain relief IP69


### Type NKEZ-M

Type NKEZ-M / PMA EMCFIX Pro EMC System - Straight fitting with strain relief, metric metal thread (Pflitsch system UNI HF DICHT)

	Order no. black, IP68 + IP69	Thread size metric	Fits to conduit size NW	Clamping range (mm)	Screen Ø (mm)	Ø max. (mm)	Thread length (mm)	Overall length (mm)	PU (pcs)
	NKEZ-M160/P2	M16 x 1.5	10	5.0 – 8.0	2.5 – 6.0	25.0	6.0	54.5	1
	NKEZ-M160/P3	M16 x 1.5	10	6.5 – 9.5	2.5 – 6.0	25.0	6.0	54.5	1
	NKEZ-M202/P1	M20 x 1.5	12	4.0 – 6.5	2.5 – 6.5	29.0	6.5	61.0	1
	NKEZ-M202/P3	M20 x 1.5	12	6.5 – 9.5	3.5 – 6.5	29.0	6.5	61.5	1
	NKEZ-M207/P3	M20 x 1.5	17	6.5 – 9.5	3.5 – 6.5	35.5	6.5	66.0	1
	NKEZ-M207/P5	M20 x 1.5	17	9.0 – 13.0	6.5 – 10.5	35.5	6.5	66.0	1
	NKEZ-M257/P3	M25 x 1.5	17	6.5 – 9.5	3.0 – 8.0	35.5	7.5	67.5	1
	NKEZ-M257/P5	M25 x 1.5	17	9.0 – 13.0	6.5 – 10.5	35.5	7.5	67.5	1
	NKEZ-M406/P4	M40 x 1.5	36	20.0 – 25.0	18.5 – 25.5	60.5	8.0	99.0	1

Very high impact resistance  
 Vibration-proof connection to PMAFLEX conduits  
 Can be used with either PMA screening braids or shielded cables  
 Integrated strain relief  
 High conduit pull-out strength  
 Very good chemical properties  
 Fits both conduit profiles - fine (T) and coarse (G)

Type NKEZ-M / PMA EMCFIX Pro EMC System - Straight fitting with strain relief, metric metal thread (PERFECT sealing ring made from NBR)


	Order no. black, IP68 + IP69	Thread size metric	Fits to conduit size NW	Fits to F.CK	Fits to F.CU	Clamping range (mm)	Thread length (mm)	Overall length (mm)	PU (pcs)
	NKEZ-M160-10	M16 x 1.5	10	06	06/10	5.0 – 9.0	10.0	63.0	1
	NKEZ-M162-10	M16 x 1.5	12	10/12.5/15	10/12	5.0 – 9.0	10.0	68.5	1
	NKEZ-M202-10	M20 x 1.5	12	10/12.5/15	10/12	9.0 – 13.0	10.0	70.5	1
	NKEZ-M207-10	M20 x 1.5	17	12.5/15	12/20	9.0 – 13.0	10.0	76.0	1
	NKEZ-M253-11	M25 x 1.5	23	15/20/25	20	11.0 – 16.0	11.0	80.0	1
	NKEZ-M257-11	M25 x 1.5	17	12.5/15	12/20	11.0 – 16.0	11.0	78.5	1
	NKEZ-M323-13	M32 x 1.5	23	15/20/25	20	14.0 – 21.0	13.0	85.5	1
	NKEZ-M329-13	M32 x 1.5	29	20/25/30	20	14.0 – 21.0	13.0	90.0	1
	NKEZ-M406-13	M40 x 1.5	36	25/30/35	40	19.0 – 27.0	13.0	98.5	1
	NKEZ-M409-13	M40 x 1.5	29	20/25/30	20	19.0 – 27.0	13.0	93.0	1
	NKEZ-M506-14	M50 x 1.5	36	25/30/35	40	24.0 – 35.0	14.0	106.5	1
	NKEZ-M508-14	M50 x 1.5	48	30/35	40	24.0 – 35.0	14.0	112.5	1
	NKEZ-M638-14	M63 x 1.5	48	35	40	32.0 – 42.0	14.0	113.5	1

Very high impact resistance  
 Vibration-proof connection to PMAFLEX conduits  
 Can be used with either PMA screening braids or shielded cables  
 Integrated strain relief  
 High conduit pull-out strength  
 Very good chemical properties  
 Fits both conduit profiles - fine (T) and coarse (G)

## PMA EMCFIX EMC System fittings with strain relief IP68


### Type NVEZ-M

Type NVEZ-M / PMA EMCFIX EMC System - Straight fitting with strain relief, metric metal thread (Pflitsch system UNI HF DICHT)

	Order no. black, IP68	Thread size metric	Fits to conduit size NW	Clamping range (mm)	Screen Ø (mm)	Ø max. (mm)	Thread length (mm)	Overall length (mm)	PU (pcs)
	NVEZ-M160V/P2	M16 x 1.5	10	5.0 – 8.0	2.5 – 6.0	23.0	6.0	49.5	1
	NVEZ-M160V/P3	M16 x 1.5	10	6.5 – 9.5	2.5 – 6.0	23.0	6.0	49.5	1
	NVEZ-M160V/P3/1	M16 x 1.5	10	6.5 – 9.5	3.5 – 8.5	26.5	6.0	60.0	1
	NVEZ-M202V/P1	M20 x 1.5	12	4.0 – 6.5	2.5 – 6.5	26.5	6.5	54.0	1
	NVEZ-M202V/P3	M20 x 1.5	12	6.5 – 9.5	3.5 – 6.5	28.5	6.5	54.0	1
	NVEZ-M202V/P5	M20 x 1.5	12	9.0 – 13.0	6.5 – 10.5	26.0	6.5	54.0	1
	NVEZ-M207V/P3	M20 x 1.5	17	6.5 – 9.5	3.5 – 6.5	31.0	6.5	60.0	1
	NVEZ-M207V/P5	M20 x 1.5	17	9.0 – 13.0	6.5 – 10.5	31.0	6.5	60.0	1
	NVEZ-M257V/P3	M25 x 1.5	17	6.5 – 9.5	3.0 – 8.0	31.0	7.5	61.5	1
	NVEZ-M257V/P5	M25 x 1.5	17	9.0 – 13.0	6.5 – 10.5	31.0	7.5	61.5	1
	NVEZ-M406V/P4	M40 x 1.5	36	20.0 – 25.0	18.5 – 25.5	60.5	8.0	98.5	1

Very high impact resistance  
 Vibration-proof connection to PMAFLEX conduits  
 To be used with shielded cables  
 Integrated strain relief  
 High conduit pull-out strength  
 Very good chemical properties  
 Self-extinguishing, free from halogens and cadmium  
 Fits both conduit profiles - fine (T) and coarse (G)

Type NVEZ-M / PMA EMCFIX EMC System - Straight fitting with strain relief, metric metal thread (PERFECT sealing ring made from NBR)

	Order no. black, IP68	Thread size metric	Fits to conduit size NW	Fits to F.CK	Fits to F.CU	Clamping range (mm)	Thread length (mm)	Overall length (mm)	PU (pcs)
	NVEZ-M120V-10	M12 x 1.5	10		12	3.0 – 6.0	10.0	53.5	1
	NVEZ-M160V-10	M16 x 1.5	10		20	5.0 – 9.0	10.0	60.0	1
	NVEZ-M162V-10	M16 x 1.5	12	10/12.5/15	20	5.0 – 9.0	10.0	61.5	1
	NVEZ-M202V-10	M20 x 1.5	12	10/12.5/15	20	9.0 – 13.0	10.0	64.0	1
	NVEZ-M207V-10	M20 x 1.5	17	12.5/15	20	9.0 – 13.0	10.0	70.0	1
	NVEZ-M253V-11	M25 x 1.5	23	15/20/25	20	11.0 – 16.0	11.0	78.5	1
	NVEZ-M257V-11	M25 x 1.5	17	12.5/15	20	11.0 – 16.0	11.0	72.5	1
	NVEZ-M323V-13	M32 x 1.5	23	15/20/25	20	14.0 – 21.0	13.0	83.0	1
	NVEZ-M329V-13	M32 x 1.5	29	20/25/30	20	14.0 – 21.0	13.0	80.0	1
	NVEZ-M406V-13	M40 x 1.5	36	25/30/35	20	19.0 – 27.0	13.0	97.0	1
	NVEZ-M409V-13	M40 x 1.5	29	20/25/30	20	19.0 – 27.0	13.0	83.0	1
	NVEZ-M506V-14	M50 x 1.5	36	25/30/35	20	24.0 – 35.0	14.0	106.0	1
	NVEZ-M508V-14	M50 x 1.5	48	30/35	20	24.0 – 35.0	14.0	105.0	1
	NVEZ-M638V-14	M63 x 1.5	48	35/8	20	32.0 – 42.0	14.0	106.0	1

Very high impact resistance  
 Vibration-proof connection to PMAFLEX conduits  
 To be used with shielded cables  
 Integrated strain relief  
 High conduit pull-out strength  
 Very good chemical properties  
 Self-extinguishing, free from halogens and cadmium  
 Fits both conduit profiles - fine (T) and coarse (G)

# Food & Beverage

## Cable protection solutions

Flexibility and cleanability for the Food and Beverage industry.

The IP69-rated PMA cable protection range for the food and beverage industry offers a choice of two high specification fittings. The JKNH nylon fitting is made from FDA-compliant material, and offers both excellent chemical resistance and quick installation, without the need for tools. The JENQ single-piece fitting is made from 316L stainless steel and is ideally suited to areas with the highest hygienic demands.

### Material

- Stainless Steel 316L material (Type JENQ)
- FDA 21 CFR and EU 10/2011 compliant PA6 material (Type JKNH & JKBH)

### Features

- IP69 rating according to EN60529
- UL Recognition according to UL1696
- NSF169 and NSF14159-1 certification
- High resistance to cleaning agents and chemicals
- Time savings, thanks to easy cleaning
- Outstanding flexibility combined with tight bending radii
- Efficient, space-saving assembly






## Stainless steel, liquid tight fitting IP69

Type JENQ

Type JENQ - Stainless steel, liquid tight fitting for overextruded conduit, IP69

	Order no.	Thread size metric	Fits to conduit size NW	Thread length (mm)	PU (pcs)
	JENQ-M162-10	M16 x 1.5	12	10.0	1
	JENQ-M207-10	M20 x 1.5	17	10.0	1
	JENQ-M253-11	M25 x 1.5	23	11.0	1
	JENQ-M329-13	M32 x 1.5	29	13.0	1
	JENQ-M406-13	M40 x 1.5	36	13.0	1
	JENQ-M508-14	M50 x 1.5	48	14.0	1

### Approvals




IP 69 rating  
 For termination of overextruded conduits  
 For high hygienic requirements  
 Suitable for food & beverage industry  
 Unique single piece design Stainless Steel 316L material  
 Seals made from FDA compliant material  
 Easy cleaning  
 High thread and system connection strengths  
 High resistance to chemicals and cleaning agents  
 Easy assembly



## Metric fittings, polyamide thread IP69

### Type JKNH & JKBH

#### Type JKNH - Straight fitting, IP69, metric polyamide thread


	Order no. blue	Thread size metric	Fits to conduit size NW	Thread length (mm)	Overall length (mm)	PU (pcs)
	JKNH-M162	M16 x 1.5	12	11.0	47.5	10
	JKNH-M202	M20 x 1.5	12	11.0	47.5	10
	JKNH-M207	M20 x 1.5	17	11.0	53.5	10
	JKNH-M257	M25 x 1.5	17	12.0	54.5	10
	JKNH-M253	M25 x 1.5	23	12.0	57.0	10
	JKNH-M323	M32 x 1.5	23	15.0	60.5	10
	JKNH-M329	M32 x 1.5	29	15.0	65.5	10
	JKNH-M409	M40 x 1.5	29	19.0	69.5	10
	JKNH-M406	M40 x 1.5	36	19.0	75.0	10
	JKNH-M506	M50 x 1.5	36	19.0	75.0	10
	JKNH-M508	M50 x 1.5	48	19.0	81.0	10
	JKNH-M638	M63 x 1.5	48	19.0	81.0	10

#### Approvals



Very high impact resistance – easy push-in assembly  
Corrosion-free  
Excellent conduit pull-out strength  
IP69 system protection for indoor splash zone areas

#### Type JKBH - 90° curved elbow fitting, IP69, metric polyamide thread

	Order no. blue	Thread size metric	Fits to conduit size NW	Thread length (mm)	Overall length (mm)	PU (pcs)
	JKBH-M162	M16 x 1.5	12	11.0	72.0	10
	JKBH-M202	M20 x 1.5	12	11.0	74.0	10
	JKBH-M207	M20 x 1.5	17	11.0	81.0	10
	JKBH-M257	M25 x 1.5	17	12.0	84.0	10
	JKBH-M253	M25 x 1.5	23	12.0	92.0	10
	JKBH-M323	M32 x 1.5	23	15.0	94.5	10
	JKBH-M329	M32 x 1.5	29	15.0	108.0	10
	JKBH-M409	M40 x 1.5	29	19.0	112.0	10
	JKBH-M406	M40 x 1.5	36	19.0	126.0	10
	JKBH-M506	M50 x 1.5	36	19.0	128.0	10
	JKBH-M508	M50 x 1.5	48	19.0	145.5	10
	JKBH-M638	M63 x 1.5	48	19.0	148.5	10

#### Approvals



Very high impact resistance – easy push-in assembly  
Corrosion-free  
Excellent conduit pull-out strength  
IP69 system protection for indoor splash zone areas

# PMAJACK Plastic and metal braids

## General technical details

Bundling and abrasion protection. Polyamide, polyester and steel braids – an alternative way to bundle and protect electrical cables.

Plastic braids manufactured from polyester and polyamide filaments – the other alternative solution for protecting and bundling cables.

This PMA cable protection system provides simple bundling and abrasion protection for cables and wires.

Various braid types to fulfill different requirements complimented by a range of braid terminations for simple and clean assembly.

### Material

- Braids made from polyamide 6.6 or polyester
- Terminations made from PA 6, aluminium or brass
- Free from halogens, REACH + RoHS compliant

### Characteristics

- Flammability of braids:
  - polyamide 6.6 UL 94 V2,
  - polyester UL 94 V0
- Braid design: Following DIN 65 164 part 1+2
- EN 45545-2 HL3






## Plastic braided hoses

### Type F.66 & C.66

#### Type F.66 - Polyamide 6.6 braided hose



	Order no. black	Order no. grey	NW	Operative range min. Ø (mm)	Operative range max. Ø (mm)	PU (m)
F.66 	F.66.04SW	F.66.04GR	4	3.0	7.0	100
	F.66.06SW	F.66.06GR	6	5.0	8.0	100
	F.66.08SW	F.66.08GR	8	7.0	10.0	100
	F.66.10SW	F.66.10GR	10	9.0	13.0	50
	F.66.12SW	F.66.12GR	12	11.0	16.0	50
	F.66.16SW	F.66.16GR	16	15.0	21.0	50
	F.66.20SW	F.66.20GR	20	20.0	26.0	50
	F.66.25SW	F.66.25GR	25	24.0	31.0	50
	F.66.30SW	F.66.30GR	30	28.0	38.0	50
	F.66.40SW	F.66.40GR	40	38.0	49.0	50
	F.66.50SW	F.66.50GR	50	48.0	65.0	50
	F.66.70SW	F.66.70GR	70	48.0	85.0	50


#### Approvals



Monofile Ø: 0.28mm for increased abrasion properties  
 Coverage: >90%  
 Polyamide 6.6  
 Specifications: DIN 5510 (S4/SR2/ST2), UL-File E 125 619, EN45545-2 HL3  
 Temperature range: -55°C to +135°C, short-term to +160°C

#### Type C.66 - Polyamide 6.6 braided hose



	Order no. black	Order no. grey	NW	Operative range min. Ø (mm)	Operative range max. Ø (mm)	PU (m)
C.66 	C.66.10SW	C.66.10GR	10	8.0	14.0	50
	C.66.12SW	C.66.12GR	12	9.0	18.0	50
	C.66.16SW	C.66.16GR	16	11.0	22.0	50
	C.66.20SW	C.66.20GR	20	14.0	26.0	50
	C.66.25SW	C.66.25GR	25	18.0	28.0	50
	C.66.30SW	C.66.30GR	30	25.0	43.0	50
	C.66.40SW	C.66.40GR	40	30.0	52.0	50
	C.66.45SW.60	–	45	40.0	73.0	60


Monofile Ø: 0.28mm for increased abrasion properties  
 Coverage: >75%  
 Polyamide 6.6  
 Specifications: DIN 5510 (S4/SR2/ST2), EN45545-2 HL3  
 Temperature range: -55°C to +135°C, short-term to +160°C

## Plastic braided hoses

### Type L.66 & G.PX

#### Type L.66 - Polyamide 6.6 braided hose



	Order no. black	Order no. grey	NW	Operative range min. Ø (mm)	Operative range max. Ø (mm)	PU (m)
L.66	L.66.04SW	L.66.04GR	04	4.0	5.0	100
	L.66.08SW	L.66.08GR	08	5.0	10.0	100
	L.66.10SW	L.66.10GR	10	7.0	13.0	50
	L.66.16SW	L.66.16GR	16	11.0	20.0	50
	L.66.20SW	L.66.20GR	20	17.0	33.0	50
	L.66.25SW	L.66.25GR	25	21.0	34.0	50
	L.66.30SW	L.66.30GR	30	25.0	45.0	50
	L.66.40SW	L.66.40GR	40	31.0	55.0	50
	L.66.50SW	L.66.50GR	50	58.0	70.0	50

Monofile Ø: 0.25mm

Coverage: > 65%


Polyamide 6.6

Specifications: DIN 5510 (S4/SR2/ST2), NF F 16-101/102 (I3/F2), EN45545-2 HL3

Temperature range: -55°C to +135°C, short-term to +160°C

#### Type G.PX - Polyester braided hose



	Order no. black	NW	Operative range min. Ø (mm)	Operative range max. Ø (mm)	PU (m)
G.PX	G.PX.05SW	05	4.5	5.5	25
	G.PX.08SW	08	7.0	9.0	25
	G.PX.10SW	10	9.0	11.0	25
	G.PX.13SW	13	11.5	13.0	25
	G.PX.16SW	16	14.5	17.5	25
	G.PX.19SW	19	17.0	21.0	25
	G.PX.25SW	25	22.5	27.5	25
	G.PX.29SW	29	26.0	32.0	25
	G.PX.32SW	32	29.0	35.0	25
	G.PX.38SW	38	34.0	42.0	25
	G.PX.50SW	50	45.0	55.0	25

Open, self winding construction

For retrofit installation.

Overlapping: 90° (+40°/-25°)

Polyester

Specifications: DIN 5510 (S4/SR2/ST2), NF F 16-101/102 (I3/F2), EN45545-2 HL3

Temperature range: -55°C to +150°C

## Braid terminations

Type RER/REV

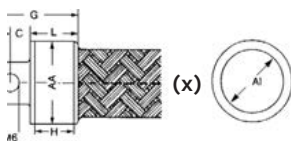
Type RER/REV - Braid termination for braided hose

	Order no. grey	NW	AI (mm)	AA (mm)	BI (mm)	BA (mm)	S (mm)	C (mm)	PU (pcs)
RER/REV	SRER-06 (x)	06	6.5	13	-	-	13	6	50
	SRER-16 (x)	16	16	24	-	-	15	7	50
	SRER-21 (x)	21	22	32	-	-	15	7	50
	SRER-29 (z)	29	30	40	-	-	39	7	50
	SRER-50 (z)	50	50	61	-	-	50	7	50
	SREV-40 (y)	40	47	58	34	44	38	10	50

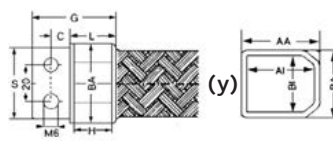


For termination and fixation of plastic braided hoses  
 Suitable for: F.66, C.66, L.66 braids  
 Polyamide 6  
 For exact braid and termination fitting configuration please refer to PMAJACK data sheets

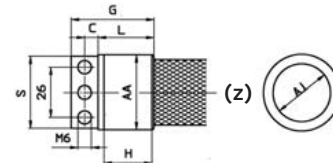
**RER**  
 x = with one mounting hole



**REV**  
 y = with two mounting holes




**RER**  
 z = with three mounting holes



## Stainless steel braids

### Type F.304

#### Type F.304 - Stainless steel braided hose

	Order no.	Braid specification	Fits to conduit size NW	Operative range min. Ø (mm)	Operative range max. Ø (mm)	PU (m)
	F.304.10	24 x 7 x 0.3	10	11.0	17.0	20
	F.304.12	24 x 8 x 0.3	12	11.0	23.0	20
	F.304.17	24 x 12 x 0.3	17	16.0	27.0	20
	F.304.23	36 x 9 x 0.3	23	23.0	32.0	20
	F.304.29	36 x 11 x 0.3	29	27.0	38.0	20
	F.304.36	36 x 9 x 0.4	36	34.0	45.0	20
	F.304.48	48 x 10 x 0.4	48	57.0	80.0	20

Surface coverage: >90%

Temperature range: -70°C to +1000°C





PMA® CABLE PROTECTION

PMA provides information and guidance on application specific challenges, and develops products to meet the needs of the industry.



# Technical annex

## Introduction

Conforms with standards. Intensive research and testing is the reason PMA continues to set new standards and trends in cable protection.

PMA products conform to worldwide standards and regulations.

As a pioneer in the field of cable protection, we have always given high priority to our own testing facilities, and we have consciously introduced stringent in-house standards. This approach has enabled PMA to exercise a significant influence on the development of international standards. Standards committees with responsibility for cable systems regularly ask our company to provide advice or participate as an active member.

### High quality product from A-Z

From basic items to high-tech products, all of our products meet the most stringent quality requirements.

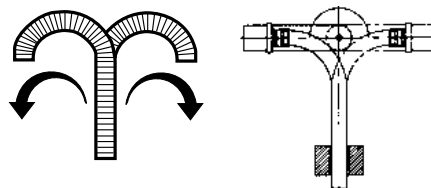
Some of the outstanding are:

- Resistance to temperature, weathering, UV radiation and chemical agents
- High system pull-out resistance
- Excellent fire protection characteristics (flammability, smoke density and toxicity)
- Excellent system ingress protection up to IP68 and IP69
- Extremely long service life
- Conformance to all major international product standards



### Resistance to fatigue when exposed to Continuous Bending Test

According to EC EN 61386 and PMA DO 9.21-4425 test procedures. Both procedures describe tests designed to evaluate conduit resistance to fatigue when exposed to continuous cycles of repetitive bending. The test procedure involves bending back and forth around a central pivotal point. Although the test procedure is the same for both standards there are differences in the test parameters and the classification of results.



**Technical annex**

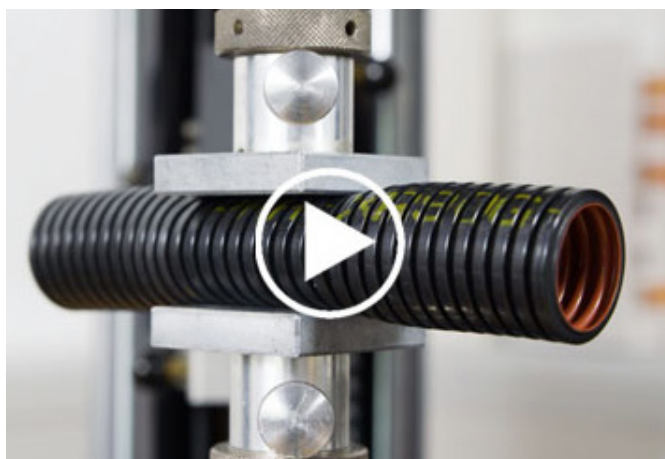
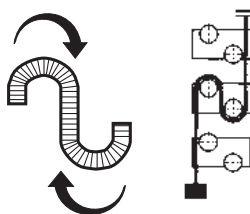
Testing methods according to IEC EN01386 and PMA internal procedures



**Resistance to fatigue** when exposed to Continuous Bending Test 2

**According to PMA DO 9.21-4420 test procedures.**

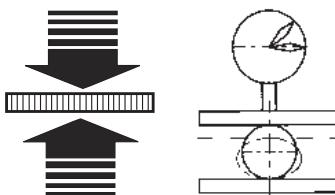
The PMA DO 9.21-4420 test procedures describes a demanding test for conduit fatigue when exposed to continuous repetitive bending. The conduit is fixed at the top of the apparatus, it passes over and under two pulley wheels. A weight is suspended at the bottom end simulating the weight of cables within the conduit. The pulley wheels move up and down continuously bending the conduit twice through 180° over its entire length.



**Compression Strength Test**

**According to IEC EN 61386 standard and PMA DO 9.21-4320 test procedures.** Both, procedures describe a test designed to evaluate conduit resistance to compression forces.

Excessive deformation of a conduit under compression could potentially cause damage to cables being protected within it. The force required to compress the conduit between two square plates to a specific % of its original diameter is measured. Relaxation over time and recovery after removal of the force are evaluated.



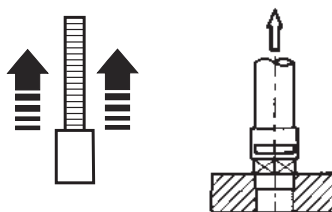
## Technical annex

Testing methods according to IEC EN01386 and PMA internal procedures



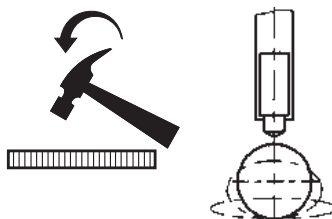
### System Security - Pull-Out Strength Test

According to IEC EN 61386 and PMA DO 9.21-4610 test procedures. IEC EN 61386 and PMA DO 9.21-4610 are designed to test the security of the connection between conduit and fitting. Two fittings with a piece of conduit between them are pulled apart with steadily increasing force. Extension of the conduit is recorded graphically against the force applied. The force required to pull the conduit out of the fitting is determined. The tests are performed at +23°C and 50% r.h.



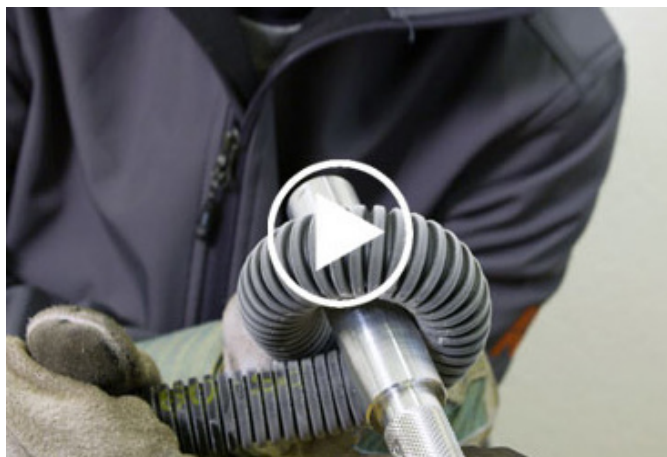
### Resistance to Impact Test

According to IEC EN 61386 standard and PMA DO 9.21-4330 test procedures. IEC EN 61386 and PMA DO 9.21-4330 describe tests to evaluate the resistance of conduits to high energy impacts. They can be performed on conduits at various temperatures. Weights of different mass are dropped from an adjustable height directly onto a conduit sample which has been conditioned at the specified temperature.



**Technical annex**

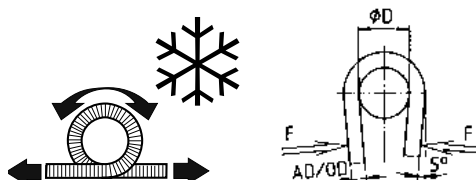
Testing methods according to IEC EN01386 and PMA internal procedures



**Flexibility at Low Temperature Test**

**According to PMA DO 9.21-4380 test procedures.**

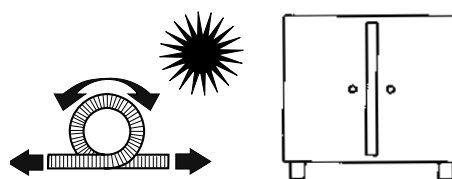
This standard describes a test procedure to evaluate the flexibility of conduits at low temperatures. The conduit under test is placed in a climatic chamber at the lowest specified operating temperature for four hours. It is then removed and immediately bent around a mandrel of diameter related to the outside diameter (OD) of the conduit.



**Resistance to thermal ageing test**

**According to PMA DO 9.21-4360 test procedures.**

This standard describes a procedure designed to evaluate the thermal stability of a conduit and its resistance to thermal ageing. The conduit is exposed to a temperature significantly above the maximum recommended continuous operating temperature for 168 hours, +160°C (PA6) or +150°C (PA12). The Flexibility at Low Temperature procedure DO 9.21-4380 is performed both before and after the thermal ageing procedure. The results are compared to detect any change in material characteristics.



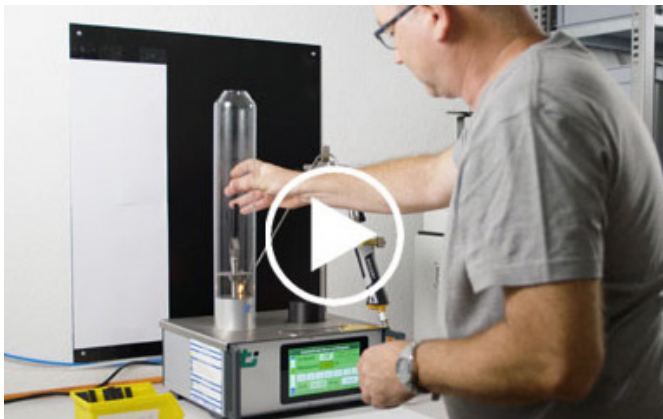
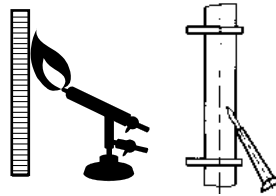
## Technical annex

Testing methods according to IEC EN01386 and PMA internal procedures



### Flammability tests

**According to IEC EN 61386 and PMA DO 9.21-4430 test procedures.** DO 9.21-4430 evaluates flammability characteristics using a defined flame from a standard burner. The time before ignition, fire propagation behaviour and extinguishing time after removal of the heat source are all factors in evaluating the flammability of conduits for a Self-Extinguishing Classification IEC 61386 uses the IEC 60695-2-11 glow wire test procedure for fittings and the IEC 60695-11-2 1 kW flame test for conduits to evaluate the flame Propagation behavior of the cable protection system allocating the classifications. Non-flame propagating or Flame Propagating.



### Flammability test - Limited oxygen supply

**According to EN ISO 4589-2 standard.** The limited oxygen index test is a commonly used method for assessing the flammability of materials. Samples of material are exposed to a flame within a chamber. The oxygen content within the controlled environment within the chamber can be varied to within 0.1%. Through an iterative method the maximum percentage of oxygen in the air at which the sample of material extinguishes is determined. This percentage of oxygen can be used as an indication of how easily a material burns. The higher the Limited Oxygen Index % value the less flammable a material is.

### Resistance to chemicals test

**According to ISO 175:210 standard.** In many real application cable protection systems are exposed to chemicals. Extensive data is available for the compatibility of various plastic materials with many different chemicals. This data can be used for assessment of compatibility for specific applications. PMA publishes a compatibility list for the most commonly occurring combinations of plastic and chemical. If chemicals are mixed or if no data is available for an assessment PMA recommends a compatibility test. Changes to appearance, dimensions and mechanical characteristics are assessed after long term exposure to the chemical to confirm compatibility.



## PMA® (DO) test procedures

PMA® has more than 15 test procedures (PMA DO) that enables us to perform cable protection-related, application-specific material and product tests.

Customers' application-specific needs are a top priority at PMA. That's why the company, as a leading manufacturer of cable protection products, voluntarily defined various supplementary in-house test procedures, which are consistently used to test PMA products to uniform criteria. This helps us safeguard the high quality and safety of PMA cable protection solutions and supply our customers with the best, most reliable products. It gives our customer the confidence that our products perform without failure or problems and meet their expectations.

The PMA test procedures apply not only to the general product properties usual for overarching standards but also to specific applications,

such as impact resistance in low-temperature rail applications, ingress protection in dynamic outdoor applications or abrasion resistance in automation applications. PMA test procedures are primarily used in areas where the market has yet to define overarching binding standards for specific applications. Many of our bespoke test procedures are geared to existing overarching standards wherever possible, and often correspond to other international standards in terms of structure, procedure and results assessment.

### Scope of a PMA test procedures:

- Detailed description of the content of testing
- Definition of samples in terms of material and quantity, distinction from other products
- Definition of the test environment, e.g. climate conditions and temperature
- Definition of devices and apparatus used in testing
- Precise definition of each relevant test parameter, such as mass, temperature, time or drop height
- Exact step-by-step definition of the test procedure
- Parameters for assessing the test result, such as the onset of mechanical losses, changes in the material, number of cycles, etc.
- List of contiguous overarching standards such as UL or IEC

—  
**For more information on the PMA test procedures (DO), please contact your PMA supplier**

## Technical annex

### Ingress protections according to IEC 60529



### Ingress Protection Test for Static Applications

According to IEC EN 60529 standard and PMA DO 7.3-1160-00 test procedures. IEC EN 60529 describes various levels of system ingress protection against both water and dust. IP\*7 and IP\*8 are sealing ratings for a system fully immersed under water. IP\*7 is precisely defined as immersion to a depth of 1 meter for 30 minutes. An IP\*8 rating indicates that the system remains dry after immersion to a depth > 1m and/or duration >30minutes. It is the intention of the standard that the time and depth of the test should be agree between customer and supplier according to the requirements of the application.



### Ingress Protection Test for Dynamic Applications

According to PMA DO 9.21-4440 test procedures. This PMA internal procedure allows the sealing performance of a cable protection system which is in continuous motion to be tested. It is significantly more difficult to achieve an efficient and long-lasting seal against ingress of water for a dynamic system than for a static system. The test equipment simulates typical movement of a cable protection system while it is submerged under water.



PMA Products

			PMAFIX Pro	PMAFIX IP68+ WPS	PMAFIX IP68/ IP68GT	PMAFIX IP66	PMA Smart Line
	IPx4	Splash water from all directions	●	●	●	●	●
	IPx5	Jet water at any angle	●	●	●	●	●
	IPx6	Powerful jet water from any angle	●	●	●	●	●
	IPx7	Submersion (1m, 30 min.)	●	●	●	-	-
	IPx8	Submersion at time and pressure >IPx7	●	●	●	-	-
	IPx9	High pressure (up to 100 bar, 80°C) water from any angle	●	●*	●*	●*	●*

\*IEC 60529 can be fulfilled without WPS (Water impact protection ring). PMA recommends the use of the WPS ring for trouble free practical applications










## Technical annex

### Ingress protections according to IEC 60529

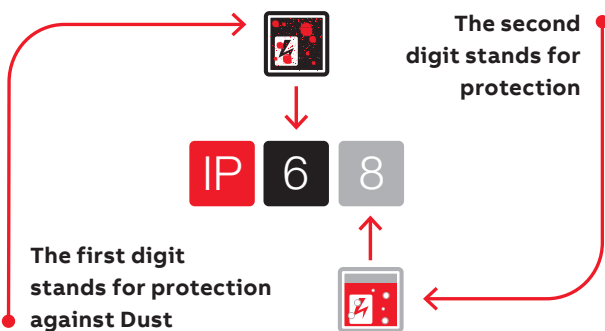
#### Dust

**Protection against contact and penetration of foreign objects**  
Degree of protection (contact/foreign bodies)

	<b>0</b>	No protection
	<b>1</b>	Objects greater than 50mm Ø, accidental touch by hands
	<b>2</b>	Objects greater than 12.5mm Ø, accidental touch by fingers
	<b>3</b>	Objects greater than 2.5mm Ø, e.g. tools/wires
	<b>4</b>	Objects greater than 1mm Ø, e.g. tools/wires
	<b>5</b>	Protected against dust - limited ingress (no harmful deposits)
	<b>6</b>	Totally protected against dust (dust-tight)

#### IP Ratings

The higher the number, the greater the degree of protection; they apply ONLY to properly installed equipment.



#### Water

**Protection against fluids**  
Degree of protection (water)

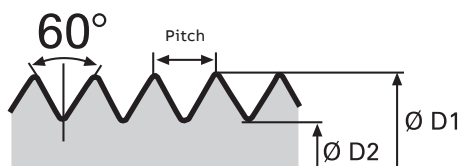
	<b>0</b>	No protection
	<b>1</b>	Protected against vertically falling drops of water
	<b>2</b>	Protected against direct sprays of water 15° from vertical
	<b>3</b>	Protected against sprays of water to 60° from vertical
	<b>4</b>	Protected against water sprayed from all directions - limited ingress permitted
	<b>5</b>	Protected against low pressure jets of water from all directions - limited ingress permitted
	<b>6</b>	Protected against strong pressure jets of water, heavy seas - limited ingress permitted
	<b>7</b>	Protection against the effects of immersion between 15cm - 1m
	<b>8</b>	Protection against long periods of immersion under a quoted pressure, e.g. 2 bar at 24 hours
	<b>9</b>	IP69 Automotive standard DIN40050 and signifies resistance to high pressure jets of water (up to 80 bar) from any angle

## Technical annex

### Table of thread dimensions

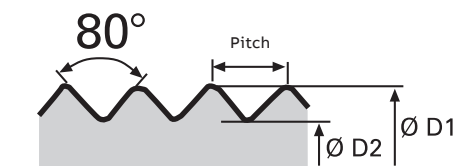
Metric fine thread - EN 60423

Metric	Pitch (mm)	Ø D1 (mm)	Ø D2 (mm)	Hole -0/+0.3 (mm)
12	1.5	12	10.16	12.0
16	1.5	16	14.16	16.0
20	1.5	20	18.16	20.0
25	1.5	25	23.16	25.0
32	1.5	32	30.16	32.0
40	1.5	40	38.16	40.0
50	1.5	50	48.16	50.0
63	1.5	63	61.16	63.0



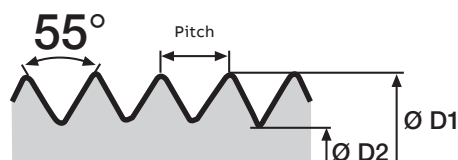
PG thread - DIN 40430

PG	Pitch (mm)	Ø D1 (mm)	Ø D2 (mm)	Hole (mm)
07	1.270	12.5	11.28	12.7
09	1.411	15.2	13.86	15.4
11	1.411	18.6	17.26	18.8
13	1.411	20.4	19.06	20.7
16	1.411	22.5	21.16	22.8
21	1.588	28.3	26.78	28.6
29	1.588	37.0	35.48	37.4
36	1.588	47.0	45.48	47.5
48	1.588	59.3	57.78	59.8



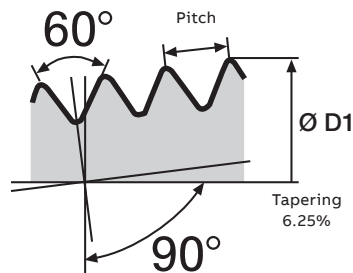
GAS pipe thread - DIN 259 Bl. 3, ISO 228/1

GAS	Pitch (mm)	Ø D1 (mm)	Ø D2 (mm)	Hole (mm)
¼"	1.337	13.157	11.445	13.4
⅜"	1.337	16.662	14.950	17.0
½"	1.814	20.955	18.631	21.3
¾"	1.814	26.441	24.117	26.8
1"	2.309	33.249	30.291	33.7
1¼"	2.309	41.910	38.952	42.4
1½"	2.309	47.803	44.845	48.3
2"	2.309	59.614	56.656	60.2



American standard taper pipe thread - ANSI/ASME B 1.20

NPT	Pitch (mm)	Ø D1 (mm)	Hole D2 (mm)
¼"	1.411	13.716	13.9
⅜"	1.411	17.145	17.4
½"	1.814	21.336	21.6
¾"	1.814	26.670	26.9
1"	2.209	33.401	33.7
1¼"	2.209	42.164	42.4
1½"	2.209	48.260	48.5
2"	2.209	60.325	60.6



## Technical annex

### Comparison table

#### Conduit

Nominal width NW		Inside Ø nom. (mm)
Standard	Metric	
07	10	6.2
10	12	9.6
10	12	9.6
12	16	12.0
12	16	12.0
17	20	16.2
17	20	16.2
23	25	22.6
23	25	22.6
29	32	29.0
29	32	29.0
36	40	36.5
36	40	36.5
48	50	47.5
48	50	47.5

#### Metric fittings

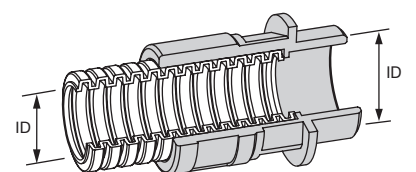
Inside diameter mm (nom.) ID		
Thread size	Metal thread	Polyamide thread
M12	–	8.0
M12	5.7	8.0
M16	9.6	11.0
M16	9.7	11.0
M20	13.5	13.0
M20	13.5	14.6
M25	18.3	19.0
M25	18.4	19.0
M32	24.2	24.0
M32	25.4	26.0
M40	31.4	32.0
M40	32.6	32.0
M50	39.5	39.0
M50	41.5	42.0
M63	51.4	53.0

#### Conduit

Nominal width NW		Inside Ø nom. (mm)
Standard	Metric	
07	10	6.2
10	12	9.6
12	16	12.0
–	–	–
17	20	16.2
23	25	22.6
29	32	29.0
36	40	36.5
–	–	–
48	50	47.5

#### PG fittings

Inside diameter mm (nom.) ID		
Thread size	Metal thread	Polyamide thread
PG07	–	8.0
PG09	9.5	10.0
PG11	12.5	13.0
PG13.5	14.5	14.5
PG16	16.5	17.5
PG21	22.0	22.5
PG29	30.0	30.5
PG36	40.0	37.5
PG42	–	46.0
PG48	49.5	50.0



Inside diameter threads to inside diameter conduits.

## Technical annex

### Tightening torques

#### Recommended tightening torques for PMA fittings - For threaded bore holes and with lock nuts

Thread	Metal* [Nm]	Polyamide** [Nm]
M12	4.0	1.5
M16	4.0	3.0
M20	6.0	4.0
M25	8.0	6.0
M32	10.0	8.0
M40	15.0	9.0
M50	15.0	10.0
M63	15.0	10.0

\* Thread combination: Metal + metal

\*\* Thread combination: Metal + polyamide or polyamide + polyamide

Thread	Metal* [Nm]	Polyamide [Nm]
PG07	3.5	1.5
PG09	4.0	1.5
PG11	6.0	2.0
PG13.5	6.0	2.5
PG16	7.0	4.0
PG21	8.0	5.0
PG29	10.0	9.0
PG36	15.0	15.0
PG48	15.0	15.0

#### Strain relief fittings - According to EN 50262

Thread	Metal NVNZ-Mxxxx NKNZ-Mxxxx	Metal NVNZ-Mxxxx/P NKNZ-Mxxxx/P	Polyamide S/BVNZ-Mxxxx [Nm] EN
	[Nm] EN	[Nm]	
M12	5.0	6.0	0.9
M16	5.0	8.0	3.0
M20	7.5	10.0	4.0
M25	10.0	10.0	7.5
M32	15.0	15.0	10.0
M40	20.0	20.0	10.0
M50	20.0	20.0	10.0
M63	20.0	20.0	10.0

**Note:** These values were gauged at standard climate (23°C/50% relative humidity)

#### According to DIN VDE 0619

Thread	Metal NVNZ-Pxxxx	Metal NVNZ-Pxxxx/P	Polyamide S/BVNZ-Pxxxx [Nm]
	[Nm]	[Nm]	
PG07	6.25	6.0	2.5
PG09	6.25	8.0	3.75
PG11	6.25	10.0	3.75
PG13.5	6.25	10.0	3.75
PG16	7.5	10.0	5.0
PG21	10.0	15.0	7.5
PG29	10.0	20.0	7.5
PG36	10.0	30.0	7.5
PG48	10.0	40.0	7.5

## Technical annex

### Applications engineering information

#### Fill factor, relevant guidelines

The question of conduit capacity or fill factor arises in the use of cable protection systems. This describes the extent to which a conduit can or should be filled with cables and/or conductors based on the available cross-sectional area.

In all cases, PMA recommends that a conduit **capacity of 70%** not be exceeded. (Application-specific procedures and standards must also be considered.)

This ensures that operation is not unnecessarily impaired by increased friction between the individual conductors in dynamically moving systems. In addition, subsequent installation of additional conductors and/or cables is also possible if necessary.

#### Wiring installation: fixation

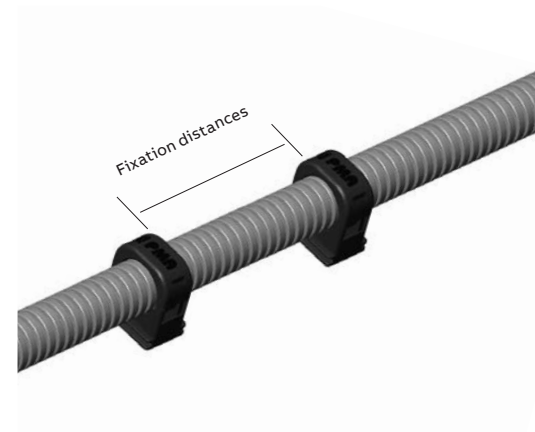
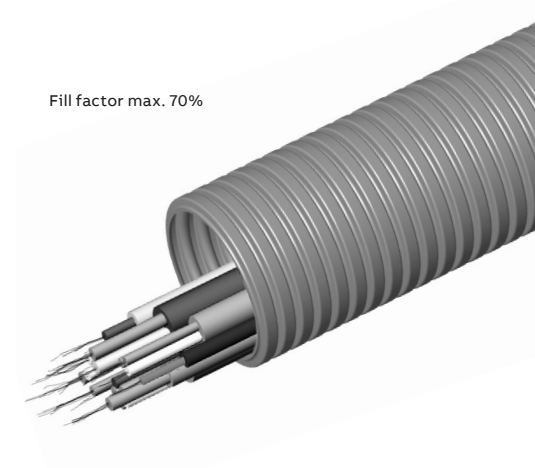
PMA AG recommends that cable protection systems be fastened with a spacing of **300mm to 500mm** between supports. This spacing can be varied depending on the application and location. This recommendation applies for all available dimensions. For larger diameters, the increased load due to the cables and conductors in the conduit is accounted for by adherence to the support spacing. PMA supplies suitable system supports for various strength requirements and applications.

European standard **EN 50343:2003-5.15** "Railway applications – Rolling stock – Rules for installation of cabling" specifies the following spacing between supports for fastening conductors:

**Horizontal wiring: 300mm**

**Vertical wiring: 500mm**

(Application specific guidelines and standards should also be considered.)



## Technical annex

### Chemical resistance

Chemical resistance comparison table

Resistance against	Chemical formula	PA6, Polyamide 6 PA6.6, Polyamide 6.6	PA12, Polyamide 12 PA11, Polyamide 11	PP, Polypropylene PE, Polyethylene	TPU	PFA PVDF
Acetic acid (10%)	C2H4O2	1	2	3	0	3
Acetone	C3H6O	3	3	3	0	3
Ammonia (30%)	NH3	3	3	3	0	3
Benzine	–	3	3	2	1	3
Brake fluid	–	3	3	3	0	3
Caustic soda	NaOH	3	3	3	1	3
Ethyl alcohol (40%)	C2H6O	3	3	3	1	3
Glycol	C2H6O2	3	3	3	0	3
Hydrochloric acid (10%)	HCL	0	1	3	0	3
Methanol	CH4O	2	3	3	1	3
Methyl ethyl ketone	C4H8O	3	3	3	0	3
Nitric acid (10%)	HNO3	0	0	2	0	3
Ozone	O3	2	2	2	1	3
Paint thinner	–	3	3	1	0	3
Perchloroethylene	C2Cl4	2	2	2	0	3
Paraffin	–	3	3	1	0	3
Phosphoric acid (10%)	H3O4P	1	2	3	0	3
Sea water	–	3	3	3	2	3
Soap solution	–	3	3	3	2	3
Sodium chloride	NaCl	3	3	3	3	3
Sulphuric acid (10%)	H2SO4	1	2	3	0	3
Toluene	C7H8	3	3	1	0	3
Trichlorethylene	C2HCl3	1	2	0	0	3
Turpentine	–	3	3	0	0	3
Urine	–	3	3	3	3	3

Resistance against oils and greases	Chemical formula	PA6, Polyamide 6 PA6.6, Polyamide 6.6	PA12, Polyamide 12 PA11, Polyamide 11	PP, Polypropylene PE, Polyethylene	TPU	PFA PVDF
Cutting oils*	–	3	3	2	1	3
Diesel oil	–	3	3	2	2	3
ASTM Oil Nr. 3	–	3	3	2	1	3
Fuel oil	–	3	3	2	1	3
Hydraulic oils*	–	3	3	2	1	3
Mineral oils	–	3	3	2	3	3
Spark-erosion liquids	–	3	3	2	1	3
Skydrol	–	1	2	2	0	3
Transformer oils*	–	3	3	2	1	3

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

**Key:**

3 = Excellent resistance/suitable for permanent contact

2 = Resistant/suitable for occasional contact

1 = Relatively resistant/suitable for short-term contact

0 = Not recommended

**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.

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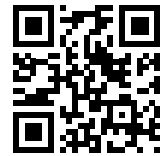
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The image illustrates the digital resources available for the XR90 Conduit product. A central laptop screen shows the product page with a video player and a list of links: 'Brochure Automation Products', 'Technical Data Sheet', and 'CAD files'. Red lines connect these links to three corresponding documents below the laptop: a brochure titled 'Automation Products', a technical data sheet for 'XR90 Conduit', and a CAD file viewer showing a 3D model of the conduit.





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