

# USER GUIDE



[www.reiku.de](http://www.reiku.de)



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**IMPORTANT!**  
**READ CAREFULLY BEFORE USE / KEEP FOR**  
**FUTURE REFERENCE**



## 1. Safety instructions

### 1.1 Principles of user information

The user information guide provides essential information on handling the product. The prerequisite for safe working is compliance with all the specified safety information and instructions.

In addition, the local accident prevention regulations and general safety regulations applicable to the area of use of the products must be observed.

**IMPORTANT!**  
**READ CAREFULLY BEFORE USE / KEEP FOR FUTURE  
REFERENCE**

**In addition to this user guide, the data sheets for the respective products also apply.**

### 1.2 Explanation of symbols

#### NOTE

Note indicates a potentially harmful situation. If it is not avoided, the product and/or the system or something in its vicinity may be damaged.



#### CAUTION

Caution indicates a potential danger. If it is not avoided, slight or minor injuries may result.



#### WARNING

A warning indicates a potentially imminent danger. If it is not avoided, death or serious injury may result.



#### DANGER



Danger refers to an imminent threat of danger. If it is not avoided, death or serious injury will result.



## 2. Utilization

### 2.1 Intended target group and user:

- All operations described in this user information guide may only be carried out by a trained specialist authorized by the system operator.
- Only install and commission the components if you have read and understood the user information guide and are familiar with the applicable regulations on occupational safety and accident prevention.
- The selection and installation of the devices and their integration are linked to the user's qualified knowledge of the relevant laws and standard requirements.



Qualified personnel only!

### 2.2 Intended use:

- Tubing, tubing accessories as well as cable sheathing and heat protection, preferably for mechanical protection and bundling of insulated conductors, wires and cables or other media lines and also for making flexible connections to peripheral devices, using a rated voltage between 50 and 1000 volts for alternating current and between 75 and 1500 volts for direct current.
- Tubing is only suitable for holding fully insulated cables and lines.
- Depending on the version, the tubing and fittings are designed for dry or wet locations and for indoor or outdoor use.
- Fittings and fasteners must be installed in accordance with the manufacturer's recommended specifications.
- Do not kink the tubing.
- Inlets and outlets switch cabinets / end of arm tool, observe tubing routing, if necessary select suitable fitting (straight, 45°, 90°). **Caution:** Points predestined for kinking.
- Take into account the maximum filling level for each application. If necessary, relieve the cables and grease the inside of the hosepacks.
- The products should and may only be used by trained and instructed specialists.
- **The relevant requirements for installation and operation must be observed for the intended use.**



## 2.3 Reasonably foreseeable misuse:

- Due to their functional properties, cable protection products can pose an electrical and/or mechanical hazard when installed, especially if they are not used, operated and maintained as intended and if unauthorized tampering is carried out.



**DANGER**



- The presence of bare conductors, stranded wires, open soldering points of cable branches, luster terminals, cable splice connectors, etc. are not permitted and can lead to electrical faults and hazards.



**CAUTION**

- Use as a media line for solid, liquid or gaseous substances is not permitted and can lead to unpredictable situations.
- Over- or under pressurization is not permitted and can lead to unpredictable situations.
- Use as a mechanical support and / or connection, or transmission of forces and torques is not permitted and can lead to damage or destruction of the product.
- Vibrations can cause the fastening to loosen and reduce the tightness.
- In outdoor areas, natural radiation sources such as light and heat combined with hydrological influences can cause the plastic to age more quickly.
- REIKU products are compatible and combinable with each other and offer the intended and intended protection. **Modifications to the product and / or combination with third-party products is prohibited and will void the guarantee, warranty and compliance with the product properties.**



## 2.4 Permissible ambient conditions

### 2.4.1 General

The permissible ambient conditions for REIKU products relate to aspects such as temperature, humidity, mechanical, chemical and electrical loads as well as other loads and their combination.

The specific permissible ambient conditions for REIKU products vary depending on the material and design. It is important to be familiar with the product data sheets and to comply with the recommended and validated ambient conditions to ensure safety and product reliability.



**Please refer to the relevant data sheet for the respective operating conditions of the product.**

### 2.4.2 General information on UV resistance

Plastics in general generally have a relatively low UV stability and can therefore age and weaken quickly when exposed to UV light. UV-stabilizing additives such as carbon black can improve this.

Black plastics usually have a high carbon black content, which gives them natural UV absorption. The carbon black absorbs the UV light, preventing it from penetrating the plastic and damaging it. As a result, black plastics generally have a higher level of protection against UV damage than other colors.

However, it should be noted that this does not mean that black plastics are completely protected from UV damage. Some ageing and degradation can still occur, especially if the plastic is exposed to high UV exposure, such as welding processes; UV sterilization, etc.

REIKU products are resistant to UV exposure under normal conditions (such as European climate).

The PARN and PARR series are suitable for outdoor use. The PARN and PARR Series also includes fittings and accessories, which are tested and certified for outdoor use in accordance with UL1696 (see file E168970).



## 2.4.3 Chemical resistance data for polyamides

Detailed resistance data on request.

Acetone	resistant	Potassium hydroxide solution, aqueous	resistant	Ozone	conditionally resistant
Formic acid, aqueous	not resistant	Silicic acid, aqueous	resistant	Perchloroethylene	conditionally resistant
Ammonia	resistant	Common salt, aqueous	resistant	Petroleum	resistant
Arsenic acid, aqueous	resistant	Carbonic acid	resistant	Phosphoric acid, aqueous	not resistant
	resistant	Copper sulphate, aqueous	conditionally resistant	Propane, liquid	resistant
petrol	resistant	Seawater	resistant	Nitric acid, hydrochloric acid, aqueous	not resistant
benzene	resistant	Methyl acetate	resistant	Carbon disulphide	resistant
beer	resistant			Hydrogen sulphide	resistant
Lead acetate, aqueous	conditionally resistant	Methyl alcohol	resistant	Sulphuric acid, aqueous	not resistant
Borax, aqueous	resistant	Methyl ethyl ketone	resistant	Soap solution	resistant
Boric acid, aqueous	conditionally resistant	Lactic acid, aqueous	conditionally resistant	Skydrol	conditionally resistant
Butane, gaseous	resistant	Mineral oils	resistant	Starch, white	resistant
Calcium chloride, aqueous	resistant	Sodium chloride	resistant	Stearic acid	resistant
Cyanide, aqueous	resistant	Caustic soda nitrol	resistant	Tallow	resistant
Diesel oil	resistant	Oils and fats	resistant	Turpentine	resistant
Ferric chloride, aqueous	conditionally resistant	Mineral without additives, at 20°C	resistant	toluene	resistant
Vinegar and acetic acid, aqueous	resistant	ASTM oil no.1, 20°C	resistant	Transformer oil	resistant
Ethyl acetate	resistant	ASTM oil no.2, 20°C	resistant	Dextrose, aqueous	resistant
Ethyl ether	resistant	ASTM oil no.3, 20°C	resistant	Trichloroethylene	conditionally resistant
Ethyl alcohol, aqueous	conditionally resistant	Animal	resistant	urine	resistant
Fatty acids	conditionally resistant	Vegetable	resistant	hydrogen	resistant
Fruit juices	resistant	Transformer oils (pyrasnols)	resistant	Tartaric acid, aqueous	not resistant
Spark erosion fluids	resistant	Silicone based	resistant	Xylene	resistant
Glycerine, aqueous	resistant	Diesel oil (double)	resistant	Zinc sulphate, aqueous	conditionally resistant
Heating oil	resistant	Heating oil	resistant		
Hydraulic oils	resistant	Hydraulic oils based on	resistant		
		-mineral oil-based	resistant		
		-glycol-based	resistant		
		(polyalkylglycols)	resistant		
		-Phosphate ester-based	resistant		
		-Drilling oil	resistant		
		-Cutting oil	resistant		



## 2.4.4 Chemical resistance data for polyurethane

Detailed resistance data on request.

Acetone	not resistant	Iron-III-chloride	largely resistant	Sodium chloride	largely resistant
alum	not resistant	Acetic acid 20-80	conditionally resistant	Sodium hypochloride solution	resistant
Aluminium chloride	largely resistant	ethanol	conditionally resistant	Sodium hydroxide solution	
Formic acid	not resistant	ethyl ether	conditionally resistant	Olive oil	resistant
ammonia	resistant	ethyl acetate	not resistant	ozone	resistant
ammonium chloride	largely resistant	ethylene chloride	largely resistant		
aniline	not resistant				
ASTM Oil No.1	resistant	Frigen 12	conditionally resistant	Paraffin oil	resistant
ASTM Oil No.2	resistant	Frigen 22	conditionally resistant	Perchloroethylene	not resistant
ASTM Oil No.3	resistant	Gear oil SAE 90	conditionally resistant	Petroether	resistant
ASTM Fuels No.1	resistant			Petroleum	largely resistant
ASTM Fuels No.2	conditionally resistant	glycerine	resistant	Vegetable oils	resistant
ASTM Fuels No.3	conditionally resistant	glycol	resistant	Vegetable fats	resistant
Benzene	not resistant	Isopropanol	not resistant	Phosphoric acid	not resistant
Brake fluid ATE	not resistant	Potassium hydroxide solution	resistant	Nitric acid	not resistant
Butanol	not resistant	Potassium dichromate	largely resistant	Hydrochloric acid	not resistant
Butyl acetate	not resistant	potassium nitrate	largely resistant	Cutting oil	conditionally resistant
Calcium chloride	largely resistant	Potassium permanganate	not resistant	Carbon disulphide	not resistant
Chlorobenzene	not resistant	paraffin	resistant	Sulphuric acid	resistant
chloroform	not resistant			Seawater	resistant
chloroprene	not resistant	magnesium chloride	largely resistant	Silver salts	resistant
cyclohexane	conditionally resistant	metahanol	conditionally resistant	Tetrachloroethylene	not resistant
cyclohexanone	not resistant	methyl acetate	not resistant	Carbon tetrachloride	not resistant
diethyl ether	resistant	methyl chloride	not resistant	Tetrahydrofuran	not resistant
diethylene glycol	resistant	Methyl ethyl ketone	conditionally resistant	toluene	not resistant
diesel oil	largely resistant	methyl glycol	not resistant	trichloroethylene	not resistant
Dimethylformamide	not resistant	methyl glycol acetate	not resistant	hydrogen peroxide	resistant
		Lactic acid	not resistant		
		Mineral oil	conditionally resistant	xylene	
		Engine oil	not resistant		



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### 2.4.5 Information on product use in potentially hazardous atmospheres

Individual components such as cable protection products **are not normally** placed on the market with the express intention of being incorporated into equipment, protective systems or devices in accordance with Directive 94/9/EC, Article 1(2), but for general technical purposes. **Their conformity (i.e. their suitability for the intended purpose in relation to the safety of the product in which they are incorporated) must be assessed as part of the conformity assessment of the whole product.**

**For this reason, we cannot certify conformity in accordance with Directive 94/9/EC from the outset. We can only predict the probable suitability of the product.**

- Conductive "LP" tubing with the option of earthing can be used for certain hazardous areas.
- **Please check the legal regulations and, if applicable, further regulations for the permissibility and suitability of REIKU products for your area of application.**

### 2.4.6 Information on product use in an electromagnetic environment

- When REIKU products are installed as part of an electrical installation, the installation may emit or be affected by electromagnetic signals. The degree of interference depends on the nature of the installation in its operating environment and the devices connected to the cabling.
- **REIKU products are passive in normal use with regard to electromagnetic influences.** Emission and immunity.

### 2.4.7 Information on product use in a fire hazard environment

- In addition to flame-retardant materials, REIKU products are also made of self-extinguishing materials. Please select the necessary protection for your requirements.

**Observe and implement the necessary fire protection concept for your system and application in accordance with national and local regulations and laws.**





**Please refer to the relevant data sheet for the protection class and height of the product.**

### 2.5 Degrees of protection

#### 2.5.1 Protection classes according to EN 60529 / IEC 60529

Protection against contact and ingress of foreign bodies.

First index

<b>Code number</b>	<b>Degree of protection (protection against contact and foreign bodies)</b>
0	No protection No protection against accidental contact, no protection against solid foreign bodies
1	Protection against large foreign bodies Protection against contact with large surfaces by hand, protection against foreign bodies with $\varnothing > 50$ mm
2	Protection against medium-sized foreign bodies Protection against contact with fingers, protection against foreign bodies with $\varnothing > 12$ mm.
3	Protection against small foreign bodies Protection against contact with tools, wires or similar with $\varnothing > 2,5$ mm. Protection against foreign bodies with $\varnothing > 2,5$ mm.
4	Protection against granular foreign bodies Protection against contact with tools, wires or similar with $\varnothing > 1,0$ mm. Protection against foreign bodies with $\varnothing > 1,0$ mm.
5	Protection against dust deposits Complete protection against contact, protection against dust deposits inside.
6	Protection against dust ingress Complete protection against contact, protection against dust ingress.

Protection against liquids

Second index

<b>Code number</b>	<b>Degree of protection (water protection)</b>
0	No protection No water protection
1	Protection against dripping water Protection against vertically falling drops of water
2	Protection against dripping water falling at an angle Protection against water droplets falling at an angle (any angle up to 15° to the vertical)
3	Protection against water spray Protection against water spray falling at any angle up to 60° to the vertical.
4	Protection against splash water Protection against splashing water from all directions
5	Protection against water jets Protection against water jet (nozzle) from any angle
6	Protection against flooding Protection against water ingress in the event of temporary flooding
7	Protection against immersion Protection against water ingress in the event of temporary immersion
8	Protection against submersion Protection against pressurized water for an indefinite period

## 2.5.2 Definition of fire protection classes according to UL 94

HB	Slow firing of a horizontally clamped sample. Self-extinguishing or firing speed within defined limits
V2	Self-extinguishing of a vertical sample within 30 seconds. Burning dripping of molten plastic permitted.
V1	Self-extinguishing of a vertical sample within 30 seconds. No burning dripping of molten plastic permitted.
V0	Self-extinguishing of a vertical sample within 10 seconds. No burning dripping of molten plastic permitted.



### 2.5.3 Definition of the hazard level according to EN 45545

The hazard level is determined depending on the operating class and design class of the rail transport vehicle.

Operating class	Type class			
	N	A	D	S
1	HL1	HL1	HL1	HL2
2	HL2	HL2	HL2	HL2
3	HL2	HL2	HL2	HL3
4	HL3	HL3	HL3	HL3

Depending on the hazard level and the corresponding set of requirements, the product may have the following properties:

Requirement set	Reference to test procedures	Parameters and unit	Maximum oder minimum	HL1	HL2	HL3
R22 (Inside)	T01	Oxygen content [%]	Minimum	28	28	>32
	EN ISO 4589-2					
	OI Oxygen index					
	T10.03	D_s max. dimensionless	Maximum	600	300	<150
	EN ISO 5659-2					
	25 kW/m <sup>2</sup>					
	Smoke gas density					
	T12	CIT NLP dimensionless	Maximum	1,2	0,9	<0,75
R23 (Outside)	NF X 70-100-1 und -2					
	600°C Toxicity					
	T01 Oxygen index	Oxygen content [%]	Minimum	28	28	>32
	EN ISO 4589-2					
	OI Oxygen index					
	T10.03	D_s max. dimensionless	Maximum	-	600	<300
	EN ISO 5659-2					
	25 kW/m <sup>2</sup>					
R24	Smoke gas density					
	T12	CIT NLP dimensionless	Maximum	-	1,8	<1,5
	NF X 70-100-1 und -2					
	600°C Toxicity					
	T01	Oxygen content [%]	Minimum	28	28	>32
	EN ISO 4589-2					
	OI Oxygen index					



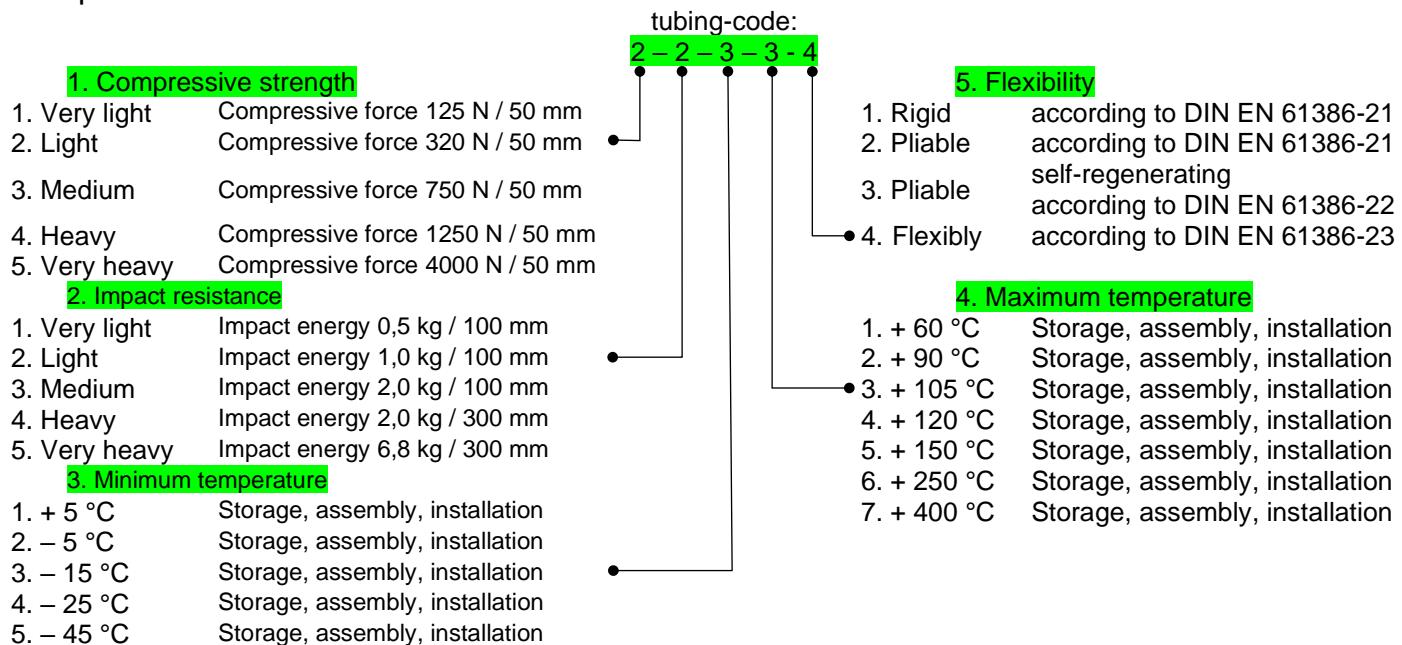
For more information, please refer to our data sheets and the rail technology catalog.



## 2.6 Classification of electrical installation conduit systems according to IEC 61386-23

Electrical conduit and accessories are tested in accordance with IEC 61386-23 and classified according to the results. The resulting tubing code provides a quick overview of the product properties.

Example:



## 2.7 Recognized products according to UL 1696

Recognized products from UL offer a variety of benefits that can help ensure your products operate safely and reliably. Recognized products undergo extensive safety testing to meet the high standards of Underwriter Laboratories. A selection of REIKU products is tested and certified by UL in accordance with the UL1696, Mechanical Protection tubing (MPT) and Fittings standard and CSA C22.2 No. 227.3, Nonmetallic Mechanical Protection Tubing (NMPT). You can obtain the relevant data and original UL documents via **REIKU file** number **E168970** and your own UL access on UL.com. The independent and autonomous access of our customers to the data ensures maximum transparency and trustworthiness.



Please refer to our information sheets for further information  
[REIKU-UL-OVERVIEW-FILE-E168970.PDF](#) or on [UL.com](http://UL.com).



## 2.8 Requirements for the selection and application of cable protection

### NOTE



Please note the information in the respective data sheets. Please note further information such as

<http://ftp.reiku.biz/REIKU-Projekthilfe-ProjectBooklet.PDF>



Qualified personnel only!

- Cable protection design and assumptions about loads should and may only be carried out by qualified personnel who have qualified knowledge of the relevant laws of the respective country and standards requirements of the corresponding systems.
- Please carefully and conscientiously evaluate the loads that occur during installation, processing and operation, such as mechanical, chemical, thermal and microbiological loads or in the form of radiation (e.g. UV radiation), and compare these with the properties specified by us. If it is determined that protection classes are not sufficient, please select the next higher protection class.
- Always ensure that there is sufficient reserve length, especially for dynamic applications and parts that move relative to each other, in order to prevent the cable protection from tearing off and possibly damaging internal cables.
- For applications subject to vibrations, dynamic swelling or alternating effects, ensure that the screws are adequately secured.
- Use screw locking aids and / or lock nuts.





## 2.8.1 Help for the selection and application of cable protection

On our homepage, [www.reiku.de](http://www.reiku.de), we offer a tool for determining the required nominal diameter depending on the number and cross-section or diameter of your cables. Please follow the link to (<https://www.reiku.de/de/service/pizzakonfigurator>).

Enter your cable data and the desired fill level (we generally recommend no more than 70%) and receive information on the nominal width to be ordered.

The screenshot shows the REIKU website with the "PIZZA-KONFIGURATOR" section highlighted. The interface includes a circular diagram labeled "WELLROHR" showing three concentric circles (1, 2, 3) representing cable sizes within a tube. A "Füllgrad:" (fill level) dropdown is set to 60%. On the right, there's a table for entering cable data:

	Kabel 1	10	79 mm <sup>2</sup>	
1	Kabel 2	25	491 mm <sup>2</sup>	
2	Kabel 3	9	64 mm <sup>2</sup>	

Below the table are several buttons: "+ KABEL HINZUFÜGEN", "AUSWAHLANFRAGEN", "ANZEIGE AKTUALISIEREN", "WERTE ZURÜCKSETZEN", and "ALS PDF HERUNTERLADEN". At the bottom left, a note says "Unsere Empfehlung zu Ihrer Eingabe: Nennweite NW 42 40.5 mm Datenblatt anzeigen".

## 2.9 Montage / Installation / Demontage



### DANGER



 Danger from electrical voltage!

When operating electrical machines and systems, certain parts are inevitably subject to dangerous electrical voltage or mechanical stress!



Qualified personnel only!



Disconnect before starting work. Secure before switching on again.



Ensure there is no voltage before starting work.



Use only with work gloves / cut-resistant gloves

- Only trained and instructed, authorized personnel should carry out installation, assembly and disassembly independently.
- Appropriate accident prevention and safety precautions must be taken during preparation for processing, assembly, commissioning, repair and disassembly.
- **Always ensure that there is no voltage before working on electrical equipment.**
- **Always ensure that there is no mechanical stress before working on mechanical systems.**
- Use personal protective equipment such as cut-resistant gloves when cutting corrugated pipes to length and to size to protect yourself from cuts.
- Use eye and head protection when working overhead to protect your face and head from impact injuries.
- When working on the scaffolding or ladder, make sure you have appropriate fall protection to avoid injuries from falling.
- For applications subject to vibrations, dynamic swelling or alternating effects, ensure that the screws are sufficiently secured to prevent unintentional loosening of the product.
- Use screw locking aids and / or lock nuts.
- Ensure a sufficient number and suitable spacing of intermediate fastenings in order to prevent loose, long cables from knocking against each other, which may result in mechanical wear and disturbing noise.

## 2.9.1 Tools to be used

REIKU products are designed for quick and easy installation. Many products can be assembled together without tools by creating a pluggable connection using clip connections. The connection to machines and robots, for example, is made using standard metric screw connections. A rudimentary tool kit is required for this.

Screwdrivers: slotted, cross slot, and Torx screwdrivers in various sizes

Wrench: in various designs and sizes, usually for tightening the lock nut

Marking pen: A marking pen is used to mark the cable protection to ensure correct positioning.

Knife: sharp, for cutting tubing to length.



Use only with work gloves / cut-resistant gloves

Alternatively, we offer the Corrugated Tube Trimmer series. Precise cutting is done manually with little force and greater safety compared to a standard sharp knife.

Article series: LSWTV. Available for the corrugated tubes sizes 17F, 17G, 23F, 23G, 29F, 29G, 36F, 36G, 42M, 48F, 48G, 52G, 70G, 95G.



2.10 *Initial operation, maintenance, cleaning***DANGER**

Danger from electrical voltage!



When operating electrical machines and systems, certain parts are inevitably subject to dangerous electrical voltage or mechanical stress!



Qualified personnel only!



Disconnect before starting work. Secure before switching on again.



Ensure there is no voltage before starting work.



Use only with work gloves / cut-resistant gloves

- Test, check and monitor the complete movement cycle before unattended operation takes place, especially for dynamic applications.
- Before carrying out any work on the product, always ensure that it is electrically and mechanically de-energized and protect the system from being switched on again.
- Check the installation for damage and wear at the intervals required by national and local safety regulations and replace damaged or worn cable protection if necessary.

Cable protection maintenance usually involves checking and maintaining the cable protection systems to ensure that they function properly and protect the cables from damage and malfunction.

This includes, but not limited to:

- Checking the tightness of cable protection conduits to ensure that no liquids or other moisture penetrate.
- Checking the mechanical integrity of cable conduits to ensure that they are not damaged or deformed.
- Cleaning cable protection systems so that they are free of dirt and debris to ensure that there is no damage or deformation.

It is important to carry out regular maintenance of cable protection systems to ensure that they function properly and protect the cables and lines from damage and malfunctions. It is advisable to draw up a maintenance plan and carry it out regularly.

## 3. Storage recommendations

### 3.1 General storage recommendation

- Plastics are sensitive to impact and brittle when cold. Do not throw, pour or drop cold plastic products. Risk of breakage! Ensure careful, gentle transportation in accordance with the material.
- Do not store finished parts and semi-finished products outdoors for long periods of time. Exposure to sunlight, atmospheric oxygen and humidity can have a lasting negative effect on the material properties (e.g. through fading and/or oxidation of the surface, water absorption, etc.). Direct exposure to sunlight or heating from one side may result in permanent warping due to thermal expansion and the release of residual internal stresses.
- Not all plastics are equally resistant to chemicals, solvents, oils and greases. Some are weakened by such substances, which can lead to surface clouding, swelling, decomposition and lasting changes in mechanical properties. It is therefore essential to keep these substances away from the products during storage.
- Only carry out dimensional checks immediately after receipt of goods if the products are at room temperature (approx. + 20°C / +68°F) on delivery. Products with higher or lower temperatures can lead to incorrect measured values due to expansion or shrinkage of the plastic as a result of the influence of temperature. Store products that are too warm/cold in a dry place and bring them to room temperature before checking the dimensions.
- Plastics and finished parts made from them are products that may have residual stresses in the material despite tempering due to their manufacturing process. These have a tendency to relax when stored over a longer period of time under the influence of temperature (e.g. due to exposure to sunlight). For the above reasons, we cannot guarantee the permanent dimensional accuracy and freedom from distortion of finished parts, despite the utmost care taken in the manufacture of the products. For long-term storage of finished parts, we recommend storing them in closed boxes under constant conditions (standard climate + 23°C / 73°F and 50 % relative humidity). The dimensional and shape changes to be expected are then minimal and generally do not affect functionality.



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### 3.2 Storage recommendation for polyamide products

Polyamide is a hygroscopic material that has the ability to absorb moisture in molecular form into the plastic matrix. The product properties can change slightly with increasing moisture content. For example, the toughness is increased and the stiffness reduced. In a standard climate at 50% relative humidity and 23°C, the following moisture equilibrium with the environment can occur in polyamides:

Material	In air (23°C / 73°F and 50% relative humidity)
Polyamide 6	2 to 3% by weight
Polyamide 12	0.8% to 1.2% by weight

To maintain a balanced moisture content of the products, REIKU recommends the following storage conditions:

storage temperature	processing temperature	rel. humidity
18°C / 64°F to 30°C / 86°F	> 20°C / 68°F	> 50%

At lower processing temperatures and especially when corrugated pipes are dried in an unnatural way, an increased bending stiffness of corrugated pipes is noticeable. In dry winter months, the moisture balance may shift slightly downwards because the material releases moisture into the environment (due to reduced relative humidity). Compared to natural conditions \* (\*Central European Climate) outdoors around 0°C / 32°F (40 to 80% relative humidity), the humidity in heated rooms without humidification can halve and fall below 20% relative humidity.

If products are brought from the outside environment into a heated processing area, the change in climate can lead to a short-term removal of moisture from the edge zone of the products. After one or two days in the processing area, however, a natural equilibrium is restored.





### 3.3 Storage recommendation for seals and O-rings

Properly stored rubber products retain their properties for many years without any significant change. Unfavorable storage conditions, on the other hand, lead to the seal becoming unusable very quickly. You should ensure optimum storage conditions, especially for longer storage periods of more than six months.

Storage conditions:

The DIN 7716 and ISO 2230 standards apply to the storage, cleaning and maintenance of rubber articles.

Important conditions for suitable storage rooms:

- Room temperature at approx. 15°C / 59°F, not higher than 25°C / 77°F
- Low temperatures down to max. -10°C / 14°F
- Relative humidity below 65%
- Dust-free, moderately ventilated atmosphere
- Shielded radiators at least one meter away from the stored goods
- No direct sunlight
- No light sources with a high UV content. (UV rays form ozone and therefore have a damaging effect on elastomer products).
- Storage sealed in opaque polyethylene bags and packed in boxes
- Elastomer products should be stored in such a way that they cannot deform





## 4. Assembly and installation instructions

### 4.1 Installation of PA- and PM- fittings

<http://ftp.reiku.biz/REIKU-Installation-PA-PM-Verschraubungen-Fittings.PDF>

### 4.2 Installation of VP- and VM-Verschraubungen

<http://ftp.reiku.biz/REIKU-Installation-VP-VM-Verschraubungen-Fittings.PDF>

### 4.3 Installation of ZKDRB-70 with PAGO\_-70

<http://ftp.reiku.biz/REIKU-Installation-ZKDRB-70+PAGO-70.PDF>

### 4.4 Installation of ZKDRB-52 with PASO\_-52

<http://ftp.reiku.biz/REIKU-Installation-ZKDRB-52+PASO-52.PDF>

### 4.5 Installation of PASOB\_G and PAWOB\_G

<http://ftp.reiku.biz/REIKU-Installation-PASOB-G+PAWOB-G.PDF>

### 4.6 Installation of PAWAB-14/17

<http://ftp.reiku.biz/REIKU-Installation-PAWAB-14-17.PDF>

### 4.7 Installation of EMC gland elements

<http://ftp.reiku.biz/REIKU-Installation-EMV-Verschraubungen-Fittings.PDF>

### 4.8 Installation of system holder

<http://ftp.reiku.biz/REIKU-Installation-Systemholder.PDF>

## 4.9 Tightening torques

Fitting- nut combination	Torque [Nm]		
Fitting with plastic-thread combined with hexagonal lock nut made of plastic. Article: <b>PA-Fitting or VP-Fitting with PAGMG</b>	3 - 4		
Fitting with plastic-thread combined with hexagonal lock nut made of metal. Article: <b>PA-Fitting or VP-Fitting with MSGMM</b>	4 - 5		
Fitting with metal-thread combined with hexagonal lock nut made of plastic. Article: <b>PM-Fitting or VM-Fitting with PAGMG</b>	3 - 4		
Fitting with metal-thread combined with hexagonal lock nut made of metal. Article: <b>PM-Fitting or VM-Fitting with MSGMM</b>	8 - 9		

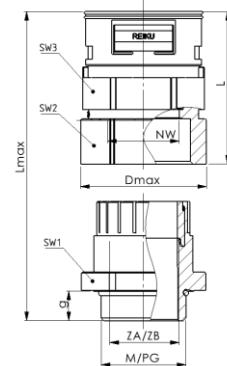
**Attention:** The specifications do disregard the size of the thread. The values are determined experimentally on some sizes and have to be considered as approximate values. Recommended to control the given values by customer.



The values given for strain relief inserts (double nipples) are recommended values. Depending on the type of thread, (Plastic or metal, **note: the plastic reference value must be used for combination**), cable types and density insert, these values can vary.

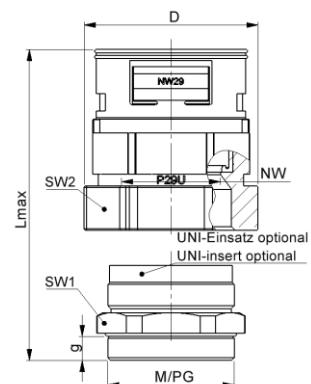
## Strain relief inserts (double nipple) for VP- und PA- connectors

thread size plastic thread	Max. Torque [Nm]
M12 / PG07	3 - 4
M16 / PG09	
M20 / PG11	
M25 / PG13,5 / PG16	
M32 / PG21	4 - 5
M40 / PG29	
M50 / PG36	
M63 / PG48	



## Strain relief inserts (double nipple) for VM- und PM- connectors.

thread size metal thread	Max. Torque [Nm]
M12 / PG07	5 - 6
M16 / PG09	7 - 8
M20 / PG11	9 - 10
M25 / PG13,5 / PG16	9 - 10
M32 / PG21	14 - 15
M40 / PG29	18 - 20
M50 / PG36	18 - 20
M63 / PG48	18 - 20



**Attention:** The specifications do disregard the size of the thread. The values are determined experimentally on some sizes and have to be considered as approximate values. Recommended to control the given values by customer.

# REIKU User Guide

## Cable Gland with male plastic thread.

Item no. with thread M in grey	Item no. with thread PG in black	Torque [Nm] Cap nut / Cable Gland
PAKOG-M12	PAKOB-M12	1,5
PAKOG-M16	PAKOB-M16	3,0
PAKOG-M20	PAKOB-M20	4,5
PAKOG-M25	PAKOB-M25	5,0
PAKOG-M32	PAKOB-M32	6,5
PAKOG-M40	PAKOB-M40	10,0
PAKOG-M50	PAKOB-M50	15
PAKOG-M63	PAKOB-M63	18



Item no. with thread M in grey	Item no. with thread PG in black	Torque [Nm] Cap nut / Cable Gland
PAKOG-P07	PAKOB-P07	1,5
PAKOG-P09	PAKOB-P09	2,0
PAKOG-P11	PAKOB-P11	3,0
PAKOG-P13	PAKOB-P13	4,5
PAKOG-P16	PAKOB-P16	4,5
PAKOG-P21	PAKOB-P21	5,0
PAKOG-P29	PAKOB-P29	6,5
PAKOG-P36	PAKOB-P36	10
PAKOG-P48	PAKOB-P48	18



## Cable Gland made of nickel-plated brass with an O-ring on thread side.

Item no. with thread M	Item no. with thread PG	Torque [Nm] Cap nut / Cable Gland
MSKOM-M12	MSKOM-P07	4,0
	MSKOM-P09	6,0
MSKOM-M16	MSKOM-P11	5,0
	MSKOM-P13	8,0
MSKOM-M20	MSKOM-P16	10,0
MSKOM-M25	MSKOM-P21	12,0
MSKOM-M32	MSKOM-P29	15
MSKOM-M40	MSKOM-P36	15
MSKOM-M50		24
MSKOM-M63	MSKOM-P48	30



**Reducers with metric and PG-thread.**

<b>Item no. with thread M</b>	<b>Item no. with thread PG</b>	<b>Torque [Nm]</b>
MSM1612	MSP0907	3,5
MSM2012	MSP1107	3,5
MSM2016	MSP1109	3,5
	MSP1307	3,5
	MSP1309	3,5
	MSP1311	3,5
	MSP1607	3,5
	MSP1609	3,5
	MSP1611	3,5
	MSP1613	3,5
MSM2516	MSP2111	5,0
MSM2520	MSP2113	5,0
	MSP2116	5,0
MSM3220	MSP2916	12,0
MSM3225	MSP2921	12,0
MSM4025	MSP3621	13,5
MSM4032	MSP3629	13,5
MSM5032	MSP4229	20
MSM5040	MSP4236	20
MSM6340	MSP4836	20
MSM6350	MSP4842	20

**Enlargers with metric and PG-thread**

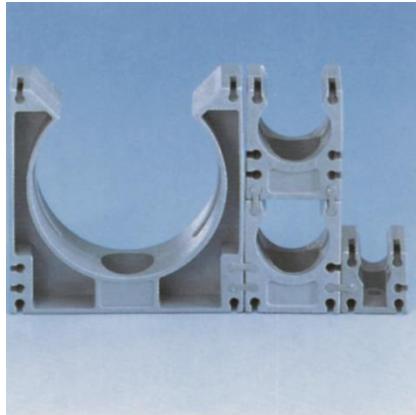
<b>Item no. with thread M</b>	<b>Item no. with thread PG</b>	<b>Torque [Nm]</b>
MSM1216	MSP0709	3,5
MSM1620	MSP0911	3,5
	MSP0913	3,5
	MSP1113	3,5
	MSP1116	3,5
MSM2025	MSP1121	6,7
	MSP1316	3,5
	MSP1321	6,7
	MSP1621	6,7
MSM2532		5,0
MSM3240	MSP1629	13,5
	MSP2129	13,5
MSM4050	MSP2936	16,0
MSM5063	MSP4248	20,0



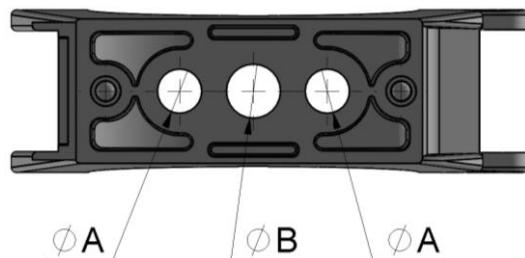
## PA- and VP- System Support

Maximum recommended tightening torques for **REIKU PA- System Support** and **VP-Strengthened System Support**

thread size	Torque [Nm]
M4	2 - 3
M5	3 - 4
M6	4 - 5



## REIKU Gripping Clamps



Article no.	metric screws ØA	metric screws ØB	Torque in Nm
PASSB-17K	-	M6	4 – 6
PASSB-29K	-	M8	13 – 15
PASSB-36K PASSB-36S	M8	M10	15 – 18
PASSB-52K PASSB-52M PASSB-52S	M8	M10	18 – 20
PASSB-70K PASSB-70M PASSB-70SE	M8	M10	18 – 20
POSSB-90K POSSB-90M	M10	M10	20 – 22

The torques refers to the assembly on a plate.

**Attention:** The specifications do disregard the size of the thread. The values are determined experimentally on some sizes and have to be considered as approximate values. Recommended to control the given values by customer



# REIKU User Guide

## 4.10 Installation of Robotics parts

For REIKU ROBOTIC applications, please refer to the REIKU\_Projecthelp\_ProjectBooklet.

<http://ftp.reiku.biz/REIKU-Projekthilfe-ProjectBooklet.PDF>

If not available, please contact REIKU Support at [sales@reiku.de](mailto:sales@reiku.de).

### 4.10.1 Installation of PAPKBs

<http://ftp.reiku.biz/REIKU-Installation-PAPKBs.PDF>

### 4.10.2 Overview of Ball solutions

<http://ftp.reiku.biz/REIKU-datasheet-Kugellösung-Ball-Solution.PDF>

### 4.10.3 Overview of cable stars

<http://ftp.reiku.biz/REIKU-datasheet-Kabelstern-cableStar.PDF>

#### 4.10.3.1 Guide to Customized drilling patterns for cable stars

<http://ftp.reiku.biz/REIKU-Leitfaden-für-Kabelstern-Guide-for-cable-star.PDF>

### 4.10.4 Overview of Gripping clamps

<http://ftp.reiku.biz/REIKU-datasheet-Spannschellen-Gripping-Clamps.PDF>

### 4.10.5 Overview of Protectors

<http://ftp.reiku.biz/REIKU-datasheet-Protektor-protector.PDF>

### 4.10.6 Overview of Jaws

<http://ftp.reiku.biz/REIKU-datasheet-Backen-Jaws.PDF>

### 4.10.7 Overview of Tube rotation

<http://ftp.reiku.biz/REIKU-datasheet-Wellrohrrotation-tube-rotation.PDF>



## 4.10.8 Overview of Spring retracting systems

<http://ftp.reiku.biz/REIKU-datasheet-Federrückholsystem-Spring-Retracting-System.PDF>

### 4.10.8.1 Overview of Springs

<http://ftp.reiku.biz/REIKU-datasheet-Federn-Springs.PDF>

## 4.10.9 Overview of Marking clips

<http://ftp.reiku.biz/REIKU-datasheet-PAMC.PDF>

## 4.10.10 Overview of CoBots

<http://ftp.reiku.biz/REIKU-datasheet-COBOT.PDF>

### 4.10.10.1 Installation of LSDFB-U

<http://ftp.reiku.biz/REIKU-Installation-LSDFB.PDF>

### 4.10.10.2 Installation of TPXWB

<http://ftp.reiku.biz/REIKU-Installation-TPXWB.pdf>

## 4.10.11 Overview of Jointed tubings

<http://ftp.reiku.biz/REIKU-datasheet-Gliederrohre-Jointed-Tubings.PDF>

## 4.11 Installation of Z-Zange for cable sheathing

<http://ftp.reiku.biz/REIKU-Installation-Z-Zange-englisch.PDF>

## 4.12 Installation of Corrugated Tube Trimmer

<http://ftp.reiku.biz/REIKU-Installation-LSWT.PDF>



## 4.13 Installation of fine braided tubing general

<http://ftp.reiku.biz/REIKU-Installation-Langoflex-range.PDF>

## 4.14 Installation of fine braided tubing

<http://ftp.reiku.biz/REIKU-Installation-Langoflex-CU-FG.PDF>



## 5. Waste management



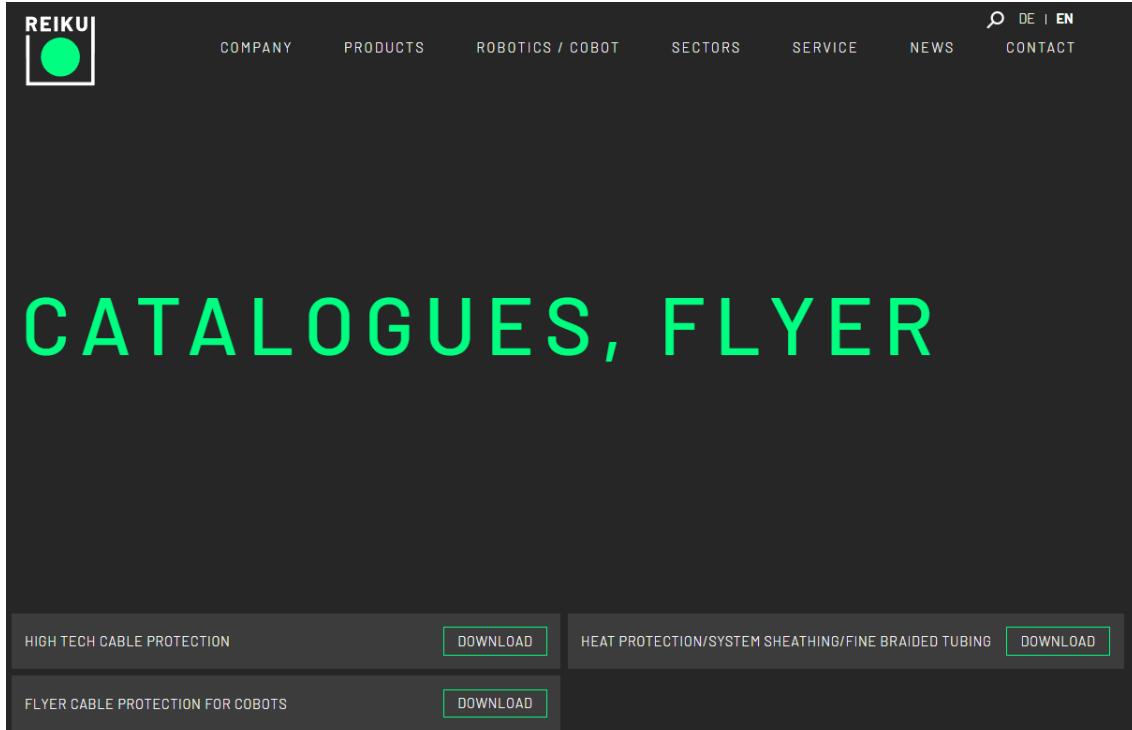
### Recycling symbol

This information must be observed in order to protect the environment.

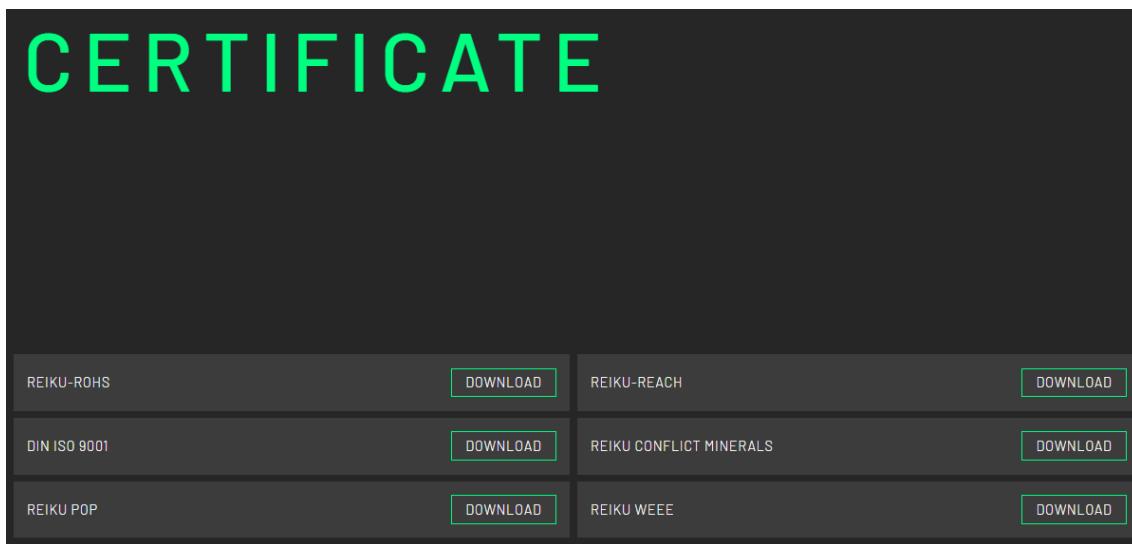
- REIKU products are made from high-quality raw materials and can be 100% recycled by type. If no take-back or disposal agreement has been made, disassembled components must be properly dismantled and recycled in Germany as follows:
  - Dispose of metal scraps for metal recycling,
  - Dispose plastic elements for recycling,
  - Dispose of remaining components sorted according to material properties.
- Disposal regulations vary from country to country. In some countries, certain types of waste, such as electronics, are required by law to be separated from other types of waste. Other countries have stricter regulations for the disposal of waste. In some countries, there are also regulations for the reuse and recycling of waste. It is important to familiarize yourself with the disposal regulations of the country in question to ensure how to properly disposed of the waste.
- Electrical waste, electronic components, lubricants and other auxiliary materials are subject to hazardous waste treatment and may only be disposed of by authorized specialty companies.
- National disposal regulations must be observed with regard to environmentally friendly disposal.
- Further information can be obtained from the relevant local authority or equivalent institutions of other nations.

## 6. Customer service and support

At [www.reiku.de](http://www.reiku.de) you will find many useful links in the Downloads (reiku.de) section.  
(<https://www.reiku.de/en/service/downloads>)



The screenshot shows the REIKU website's navigation bar at the top with links for COMPANY, PRODUCTS, ROBOTICS / COBOT, SECTORS, SERVICE, NEWS, and CONTACT. A search icon and language links (DE | EN) are also present. The main content area features a large green title 'CATALOGUES, FLYER'. Below it are two rows of download links. The first row contains 'HIGH TECH CABLE PROTECTION' with a 'DOWNLOAD' button and 'HEAT PROTECTION/SYSTEM SHEATHING/FINE BRAIDED TUBING' with a 'DOWNLOAD' button. The second row contains 'FLYER CABLE PROTECTION FOR COBOTS' with a 'DOWNLOAD' button.

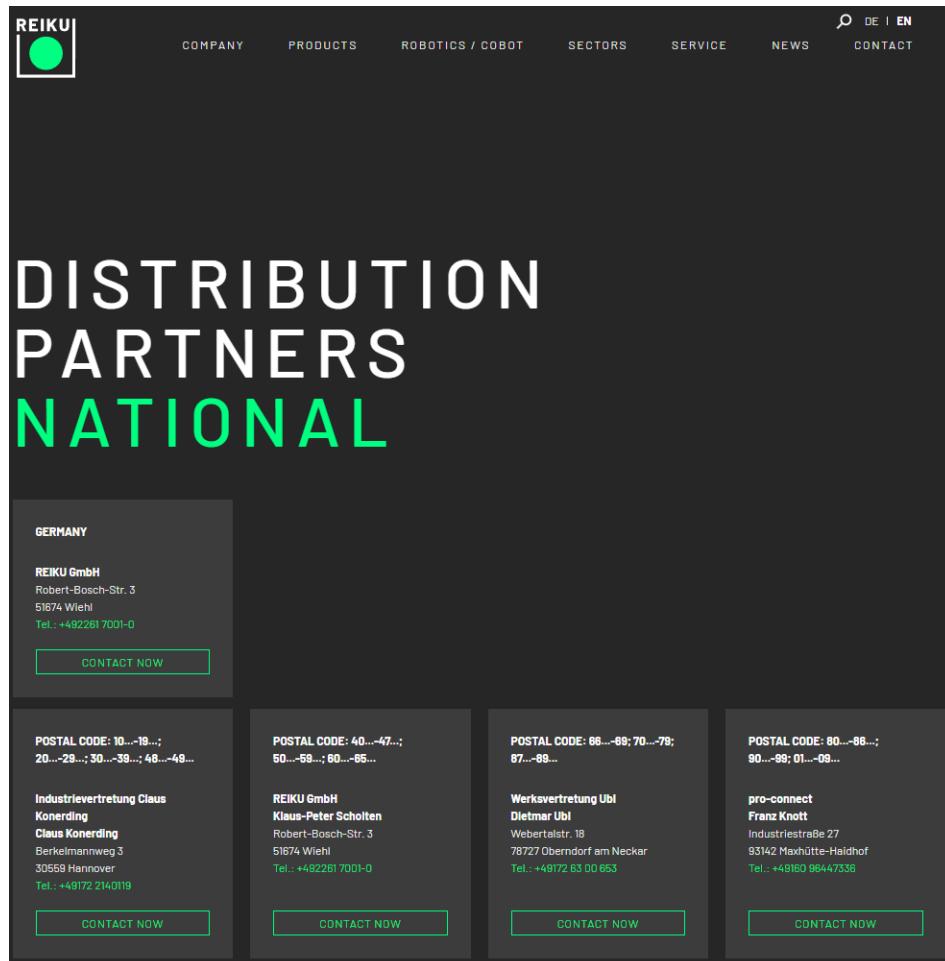


The screenshot shows the REIKU website's navigation bar at the top. The main content area features a large green title 'CERTIFICATE'. Below it are two rows of download links. The first row contains 'REIKU-ROHS' with a 'DOWNLOAD' button and 'REIKU-REACH' with a 'DOWNLOAD' button. The second row contains 'DIN ISO 9001' with a 'DOWNLOAD' button and 'REIKU CONFLICT MINERALS' with a 'DOWNLOAD' button. The third row contains 'REIKU POP' with a 'DOWNLOAD' button and 'REIKU WEEE' with a 'DOWNLOAD' button.



# REIKU User Guide

For direct contact to our [Distribution partners \(reiku.de\)](#) follow this link.  
(<https://www.reiku.de/en/company/distribution-partners-2>)



The screenshot shows the REIKU website's distribution partners page. At the top, there's a navigation bar with links for COMPANY, PRODUCTS, ROBOTICS / COBOT, SECTORS, SERVICE, NEWS, CONTACT, and language selection (DE | EN). The main title 'DISTRIBUTION PARTNERS NATIONAL' is prominently displayed. Below it, there's a section for Germany with contact information for REIKU GmbH. Further down, there are four boxes representing different distribution partners, each with a 'CONTACT NOW' button.

**GERMANY**

**REIKU GmbH**  
Robert-Bosch-Str. 3  
51674 Wiehl  
Tel.: +492261 7001-0

**Industrievertrag Klaus Konerding**  
Claus Konerding  
Berkelmannweg 3  
30559 Hannover  
Tel.: +49172 214019

**REIKU GmbH Klaus-Peter Scholten**  
Robert-Bosch-Str. 3  
51674 Wiehl  
Tel.: +492261 7001-0

**Werksvertretung Uhl Dietmar Uhl**  
Weberstr. 18  
78727 Oberndorf am Neckar  
Tel.: +4972 63 00 653

**pro-connect Franz Knott**  
Industriestraße 27  
93142 Maxhütte-Haidhof  
Tel.: +49160 98447336



The screenshot shows the REIKU website's international distribution partners section. It features a large 'INTERNATIONAL' heading. Below it, there's a list of countries with dropdown arrows: AUSTRALIA, AUSTRIA, BELGIUM, BRAZIL, CANADA, CHINA, CZECH REPUBLIC, DENMARK, ESTONIA, FINLAND, and FRANCE. At the bottom, a call-to-action button says 'Many more on the homepage'.

**AUSTRALIA**

**AUSTRIA**

**BELGIUM**

**BRAZIL**

**CANADA**

**CHINA**

**CZECH REPUBLIC**

**DENMARK**

**ESTONIA**

**FINLAND**

**FRANCE**

Many more on the homepage

## 7. Closing clause

All information is given in good faith and without guarantee. Subject to change without notice. The responsibility for the intended use of REIKU products and the suitability of the product for a specific application, including compliance with the current valid electrical installation and safety regulations, lies with the customer. The operator is responsible for all personal injury and property damage resulting from modifications to the product, improper and untested use. REIKU accepts no responsibility for improperly used products and any resulting consequential damage and is not responsible for compliance with the applicable electrical installation and safety laws.

### 7.1 Limitation of liability

All information and notes in this user guide have been compiled taking into account the applicable standards and regulations, the state of the art and our many years of knowledge and experience.

The manufacturer accepts no liability for damage due to:

- Non-observance of the instructions
- Non-intended use
- Use of non-qualified personnel
- Unauthorized modifications
- Technical modification
- Use of and with non-authorized parts

The actual scope of delivery may differ from the explanations and illustrations described here in the case of special versions, the use of additional ordering options or due to the latest technical changes.

In all other respects, the obligations agreed in the delivery contract, the General Terms and Conditions as well as the manufacturer's terms and conditions of delivery and the statutory regulations valid at the time of conclusion of the contract shall apply.

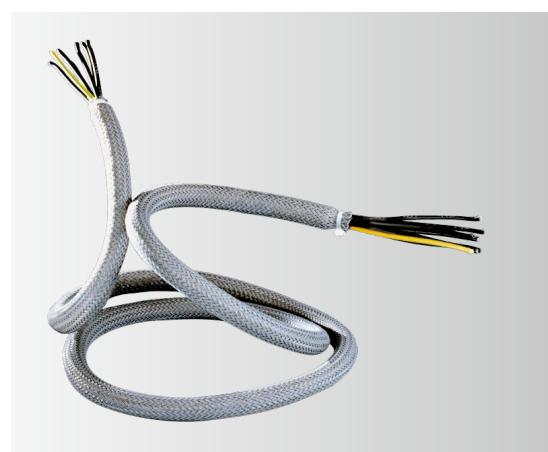
We reserve the right to make technical changes in the context of improving performance characteristics and further development.



## Kabelschutz auf einen Blick Das REIKU®-System

Cable Protection at one sight  
The REIKU®-System

**Kabelschutz aus Polyamid**  
**Wellrohre und**  
**Anschlussarmaturen**  
**Systemummantelung mit**  
**Gleitverschlusstechnik**  
**GL-Hitzeschutz**  
**Feingeflechtschläuche**



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REIKU.GmbH reiku-gmbh



RE102023PS-KATALOG



WWW.REIKU.DE