

# Innovation in lightning protection High-voltage-resistant, insulated HVI®Conductor



# Easy to install, sustainable, visually appealing: DEHN HVI®Lightning Protection

The HVI®Conductor is a high-voltage-resistant, insulated down conductor from DEHN, the expert for lightning protection and earthing, surge protection and safety equipment. Insulated lightning protection based on HVI®Conductors is durable and sustainable: HVI®Lightning Protection can remain as it is even if photovoltaic or air-conditioning systems are subsequently installed on the roof while conventional lightning protection systems must be adapted.

### Unique design

When using conventional lightning protection systems, it is often not possible to maintain the necessary separation distances. This is no problem with the HVI®Conductor thanks to its unique design and special sheath. The lightning current carrying conductor of the HVI®Conductor is wrapped with insulating material in such a way that the required separation distance from other conductive parts of the building, electric lines and pipes is maintained. The coaxial conductor consists of an inner copper conductor with a high-voltage-resistant thick-walled insulation and a weather-resistant semi-conductive special outer sheath. Thus, creeping flashover along the surface of the conductor is prevented.

#### Easy to install

The variable sealing end and tools such as HVI®strip facilitate installation.

### Wide range of applications

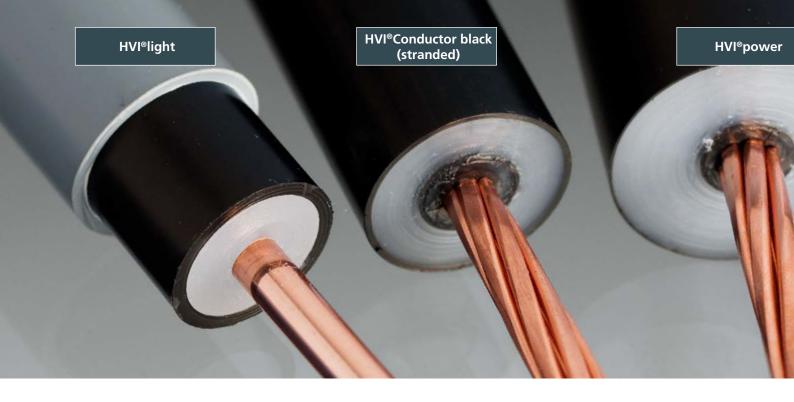
The HVI®Conductor is an ideal solution for external lightning protection systems on residential and industrial buildings, wind turbines, photovoltaic systems, biogas plants, mobile phone antennas and systems of the process industry with hazardous areas such as gas compressor stations and oil rigs.

#### Visually appealing

The HVI®Conductor grey can be painted to match the colour of the building's architecture. It is also possible to integrate the HVI®Conductor into or behind the facade. Consequently, the HVI®Conductor offers entirely new design possibilities.

### Benefits of the DEHN HVI®Lightning Protection:

- Unique design
- Easy to install
- Can be used for a wide range of applications
- Ideally suited for subsequent changes on the roof
- Can be adapted to match the colour of the building's architecture (HVI®Conductor grey)



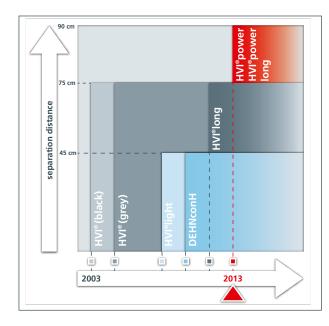
## High-voltage-resistant, insulated HVI®Conductor: Innovation in external lightning protection

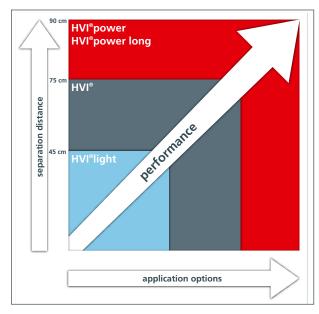
In 2003, DEHN launched an innovation in external lightning protection, the high-voltage-resistant, insulated HVI®Conductor. Since then, thousands of buildings and installations have been successfully equipped with HVI®Lightning Protection.

This high number of installed HVI®Conductors and intensive development work gave us an experience advantage which is reflected in the variety of HVI®Conductor types.

The application range has been gradually expanded by HVI®light, HVI®long, HVI®power, HVI®power long and DEHNcon-H, which is available as a pre-assembled set. Thus, HVI®Conductors can be used for a wide range of applications.

Only DEHN offers such a broad range of conductor types for all ranges of application and more than 10 years of experience in insulated lightning protection with HVI®Conductors.







## The separation distance is crucial

The overview on the right side makes it easier to select the right HVI®Conductor. The criterion for this selection is the separation distance.

The IEC 62305-3 standard requires that a defined separation distance has to be kept as a minimum distance between the lightning protection system and electrically conductive materials. This prevents dangerous flashover and thus sparking, ensuring that lightning currents are reliably conducted to the earth-termination system. The high-voltage-resistant, insulated down conductors from DEHN provide an equivalent separation distance and thus meet the normative requirements.

## s < 75 cm "air"



### **Separation distance**

The separation distance can be calculated automatically by means of the DEHNsupport Toolbox software.



DEHNsupport Toolbox For a demo version and more detailed information on our DEHNsupport Toolbox software, please visit our website.









## HVI®light Conductor: Ideally suited for flat roofs

**S ≤** 45 cm

The HVI®light Conductor supplements the proven and tested HVI®Conductor which has been used many times in practice. Designed for low, large-scale buildings where the separation distance cannot be maintained with conventional lightning protection systems, it opens up new design options in lightning protection.

In many cases, there is a risk of uncontrolled flashover from the bare air-termination system or down conductor to metal electrical installations such as photovoltaic systems. Flashover may also occur between the roofing and metal or electrical installations underneath it. This can be prevented by means of a lightning protection system with HVI®light Conductors.

HVI®light Conductors are designed for intermeshing the air-termination system on flat roofs. They feature a dark grey sheath and thus ideally match the colours used on flat roofs. HVI®light Conductors are delivered on a disposable reel for on-site assembly.



HVI®light Conductor (Part No. 819 125)



**HVI®light Conductor on a reel** 



Connection element (Part No. 819 299)

HVI <sup>®</sup> light – Technical data		
Equivalent separation distance	≤ 45 cm "air"	≤ 90 cm "solid material"
Outer diameter	20 mm (dark grey)	
Adjusting range	120 cm	
Cross-section of the inner conductor (Cu)	19 mm <sup>2</sup>	
Minimum bending radius	200 mm	
Permanent temperature (fixed installation)	-30°C to +70°C	
Ambient temperature and conductor temperature during installation and processing	-5°C to +40°C	
Weight	~	400 g/m



## **HVI**<sup>®</sup>light Conductor: Easy and fast installation

The HVI®light Conductor can be installed easily and quickly without sealing end.

A sealing end which is connected to the functional equipotential bonding system of the building is not required. Instead, the conductor is connected to the supporting tube in the tripod which does not have to be connected to the functional equipotential bonding system.

More detailed information on HVI®light Conductors can be found in the installation instructions. Scan the QR code, click "More" and "Installation instructions".



More detailed information on HVI®light

## Accessories for HVI®light Conductors

Air-termination mast with connecting plate for four HVI®light Conductors can be adapted to a roof pitch of up to  $10^\circ$ .

Туре	Part No.
Air-termination mast 30 for HVI®light Conductor SET II	819 286
Length of the supporting tube: 1500 mm	
Total height: 3100 mm	

Conductor holder for HVI®light Conductors can be fixed on flat roofs or walls.



Туре	Part No.
Flat roof conductor holder	253 015
Adapter for Part No. 253 015	253 026
Wall-mounted conductor holder	275 229



## **DEHNcon-H: Ideally suited for** residential buildings with gable roof



**DEHNcon-H with integrated HVI®light Conductor is** ideally suited for gable roofs. It also allows to easily and effectively protect complex roof structures by a low number of air-termination rods.

The dimensions of the supporting tubes of DEHNcon-H were reduced: Glass-fibre reinforced plastic supporting tubes have a diameter of 30 mm and aluminium supporting tubes a diameter of 40 mm. Thus, they are unobtrusive and have a small area exposed to wind. Thanks to the reduced wind load and its light-weight construction, DEHNcon-H can be easily retrofitted, for example on antenna standpipes.

DEHNcon-H is available as pre-assembled set:

- Set I is used if the air-termination system is directly connected to the earth-termination system of the building.
- Set III is used for connection to other parts of the external lightning protection system.







Set III (Part No. 819 260)

DEHNcon-H – Technical data			
Equivalent separation distance	≤ 45 cm "air"	≤ 90 cm "solid material"	
Outer diameter	20 mm (dark grey)		
Sealing end	≤ 12		
Cross-section of the inner conductor (Cu)	19 mm²		
Minimum bending radius	2	200 mm	
Permanent temperature (fixed installation)	-30°	°C to +70°C	
Ambient temperature and conductor temperature during installation and processing	-5°(	C to +40°C	
Weight	~ 400 g/m		





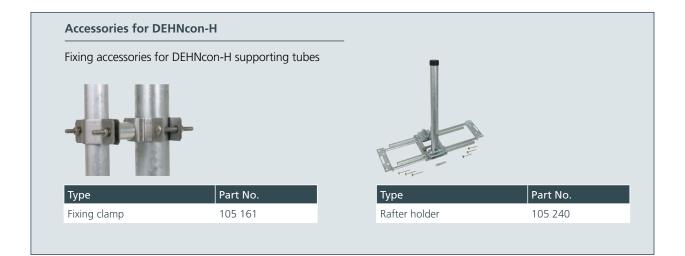
DEHNcon-H can be installed by means of rafter holders which are fixed on gable roofs to create larger protected zones e.g. for solar thermal or photovoltaic systems. The extremely small design of the DEHNcon-H system and the resulting reduced length of the sealing end of 1.2 m require that the integrated HVI®light Conductor has to be connected to the functional equipotential bonding system of the building in a defined way.

To this end, a braided strip made of stainless steel is led out of the lower end of the supporting tube and must be connected to the functional equipotential bonding system of the building, for example to the antenna standpipe. Due to the integrated sealing end and the small design, DEHNcon-H is only available as a pre-assembled system.

More detailed information on DEHNcon-H can be found in the installation instructions. Scan the QR code, click "More" and "Installation instructions".



More detailed information on DEHNcon-H





## HVI®Conductor: Pre-assembled standard solution

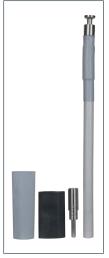
**S**≤ 75 cm

The HVI®Conductor is a standard type for a wide range of applications: It protects large roof-mounted structures, antennas or masts with information technology equipment from direct lightning strikes – also in potentially explosive areas.

The HVI®Conductor is used for a separation distance  $s \le 75$  cm in air and  $s \le 150$  in case of solid material. It can be directly routed to the earth-termination system or it can be installed in the form of an elevated isolated ring conductor. The HVI®Conductor can be easily installed thanks to the variable sealing end.



HVI®Conductor black (installed inside the supporting tube: Part No. 819 220 installed outside the supporting tube: Part No. 819 226)



HVI®Conductor grey (installed inside the supporting tube: Part No. 819 223 installed outside the supporting tube: Part No. 819 227)

HVI®Conductor – Technical data		
Equivalent separation distance	≤ 75 cm "air"	≤ 150 cm "solid material"
Outer diameter	20 mm (black)	23 mm (grey)
Sealing end	≤ 150  cm  19 mm²  200 mm (black) 230 mm (grey)  -30°C to +70°C  g -5°C to +40°C	
Cross-section of the inner conductor (Cu) (solid / stranded)		
Minimum bending radius		
Permanent temperature (fixed installation)		
Ambient temperature and conductor temperature during installation and processing		
Weight	~ 480 g/m (black)	630 g/m (grey)



## HVI®long Conductor: Ideally suited for on-site assembly



In case of new buildings and building restorations, the exact conductor length can rarely be defined at the design stage of the lightning protection system. Therefore, the HVI®long Conductor, which can be assembled on site, is a perfect solution.

The HVI®long Conductor is available on a reel with a length of 100 m. The installer determines the exact length on site, cuts the conductor to length, strips it and attaches the connecting set.



HVI®long Conductor (black) Part No. 819 135



HVI®long Conductor (grey) Part No. 819 136



100 m on a reel Part No. 819 135 (black) Part No. 819 136 (grey)



Connection set for HVI®long Conductors Part No. 819 146 (black) Part No. 819 148 (grey)

HVI®long – Technical data		
Equivalent separation distance	≤ 75 cm "air"	≤ 150 cm "solid material"
Outer diameter	20 mm (black)	23 mm (grey)
Sealing end	≤ 1	50 cm
Cross-section of the inner conductor (Cu) (solid / stranded)	19 mm²	
Minimum bending radius	200 mm (black)	230 mm (grey)
Permanent temperature (fixed installation)	-30°C	to +70°C
Ambient temperature and conductor temperature during installation and processing	ing -5°C to +40°C	
Weight	~ 480 g/m (black)	630 g/m (grey)



## HVI®Conductor and HVI®long Conductor: Flexible and easy to install

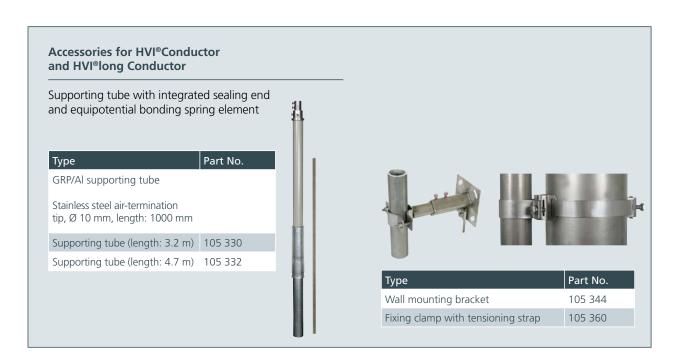


The HVI®Conductor and HVI®long Conductor are available with black and grey sheath. This allows to perfectly adapt them to the building's architecture.

The grey sheath can be painted to perfectly match the colour of the building's facade. It is also possible to unobtrusively integrate the HVI®Conductor into or behind the facade. The outer grey sheath additionally provides mechanical protection.

### Special application benefit: Variable sealing end

Both the new sealing end spring and the variable sealing end range are easy to install. The functional equipotential bonding system is directly connected to the metal supporting tube.





## Installation of HVI®Conductors in hazardous areas

In many industrial sectors, special requirements are placed on entire installations or parts of installations in hazardous areas (division into Ex zones). This division is also relevant for a possible lightning-related ignition source.

When installing high-voltage-resistant, insulated down conductors, Ex zones must be taken into account. The Ex zone classification of the operator is mandatory for the installer of the lightning protection system.

The HVI®Conductor can be installed in Ex zones 1 or 2 and 21 or 22.

If the HVI®Conductor is installed in these hazardous areas, special installation conditions must be observed. These are specified in greater detail in installation instructions No. 1501.

The installation of different types prevents discharge and thus sparking when lightning currents flow through the HVI®Conductor. Special conductor holders are required for installation. These conductor holders are completely made of stainless steel to protect them in possible corrosive environments.



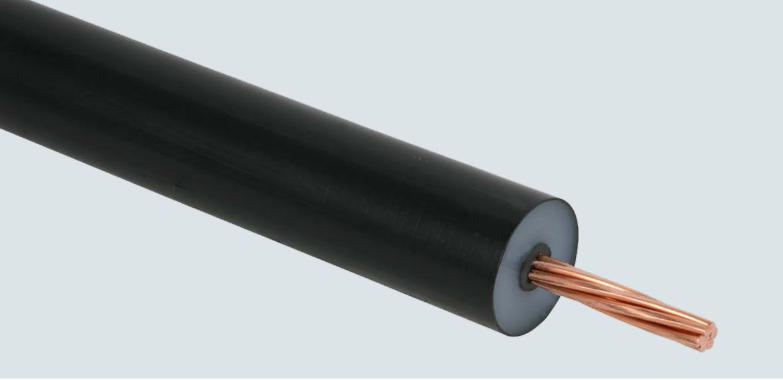
HVI®-Ex W70 holder, Part No. 275 440



HVI®-Ex W200 holder, Part No. 275 441



HVI®-Ex P200 holder, Part No. 275 442



## HVI®power and HVI®power long Conductor: Suits all classes of LPS



The HVI®power Conductor can also be used for class of LPS I since the complete system\* is tested with lightning impulse currents of 200 kA (10/350 µs). Therefore, the HVI®power Conductor is an ideal solution for *all* classes of LPS.

### Separation distance increased by 20% \*\*

The HVI®power Conductor allows to maintain an equivalent separation distance of 90 cm in air and 180 cm in case of solid material.

### Easy and fast installation

The new sealing end spring in the supporting tube allows automatic contact to the semi-conductive sheath of the HVI®power Conductor, thus establishing the sealing end. The functional equipotential bonding system is directly connected to the metal supporting tube, thus ensuring fast installation of the HVI®power and HVI®power long Conductor without installation errors. Thanks to its variable sealing end, the HVI®power Conductor is particularly easy to install.

The HVI®power Conductor is installed in the stainless steel supporting tube, providing the following benefits:

- Improved aesthetic appearance since the conductor is not visible
- Smaller area exposed to wind
- Fast installation



Pre-assembled HVI®power Conductor, Part No. 819 160



HVI®power long Conductor on a reel, Part No. 819 137



Connection set for HVI®power long Conductors, Part No. 819 142

HVI®power and HVI®power long – Technical data		
Equivalent separation distance	≤ 90 cm "air"	≤ 180 cm "solid material"
Outer diameter	27	mm (black)
Length of the sealing end	180 cm	
Cross-section of the inner conductor (Cu)		25 mm <sup>2</sup>
Minimum bending radius	270 mm (black)	
Permanent temperature (fixed installation)	-50	°C to +70°C
Ambient temperature and conductor temperature during installation and processing	-5°	C to +40°C
Weight	~	730 g/m



<sup>\*</sup> Including accessories

<sup>\*\*</sup> Compared to other high-voltage-resistant conductors with a separation distance of 75 cm



## Tools for HVI®power Conductors

The HVI®power Conductor is particularly easy to use. It can be installed without problems by means of the practice-proven HVI®strip 27 tool.

The plastic insulation can be easily stripped with the HVI®strip 27 tool without damaging the copper conductor. After that, the HVI®power Conductor can be easily installed by means of the connection set.



HVI®strip 27 tool for easily stripping the HVI®power Conductor

HVI®strip 27 – Technical data	Part No. 597 227
Outer diameters of the conductor	27 mm
Material of the stripping head	Aluminium
Material of the blade	Stainless steel
Material of the handle	Impact-resistant plastic



## **Accessories for HVI®Conductors / HVI®long Conductors**

#### **Connection set**

Outer diameters of 20 mm / 23 mm For installation inside the supporting tube



	Type	Part No.
>	Connection set <b>Ø</b> 20 mm	819 145
	Connection set Ø 23 mm	819 147

#### **Connection set**

Outer diameters of 20 mm / 23 mm For installation outside the supporting tube



Connection set <b>Ø</b> 20 mm 819 146		Туре	Part No.
Connection set <b>0</b> 23 mm 810 1/18		Connection set <b>Ø</b> 20 mm	819 146
Connection set <b>9</b> 25 min	,	Connection set Ø 23 mm	819 148

#### **Fixing set**

For installing the conductor at the supporting tube, consisting of a connecting plate and fixing ring with four slotted conductor holders for the sealing end



Type	Part No.
Connection set Ø 20 mm	819 294

### **Stripping tool**

For stripping HVI®Conductors and HVI®long Conductors



Туре	Part No.
HVI®strip 20	597 220

## Accessories for HVI®power Conductors / HVI®power long Conductors

#### **Connection set**

For HVI®power long Conductors, outer diameters of 27 mm, for installation inside the supporting tube



Туре	Part No.
Connection set	819 142

### **Stripping tool**

For stripping HVI®power and HVI®power long Conductors



Туре	Part No.
HVI®strip 27 set	597 227

### **Stripping head**

Separately, without handle



Туре	Part No.
HVI®head 27	597 127

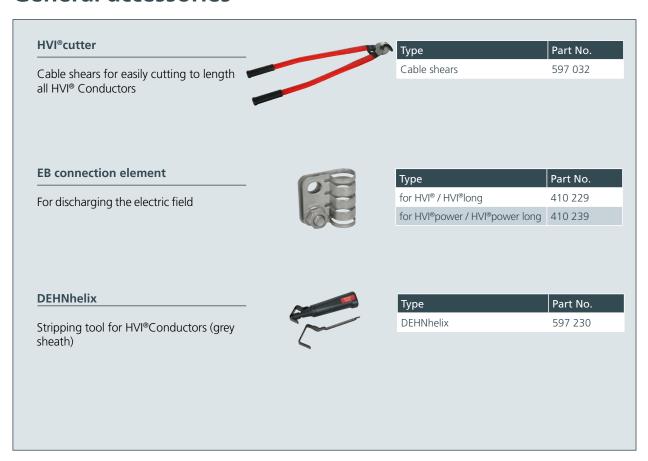
#### **Spare blades**

For HVI®head 27



	art No.
Spare blades (four pieces) 5	97 102

## **General accessories**

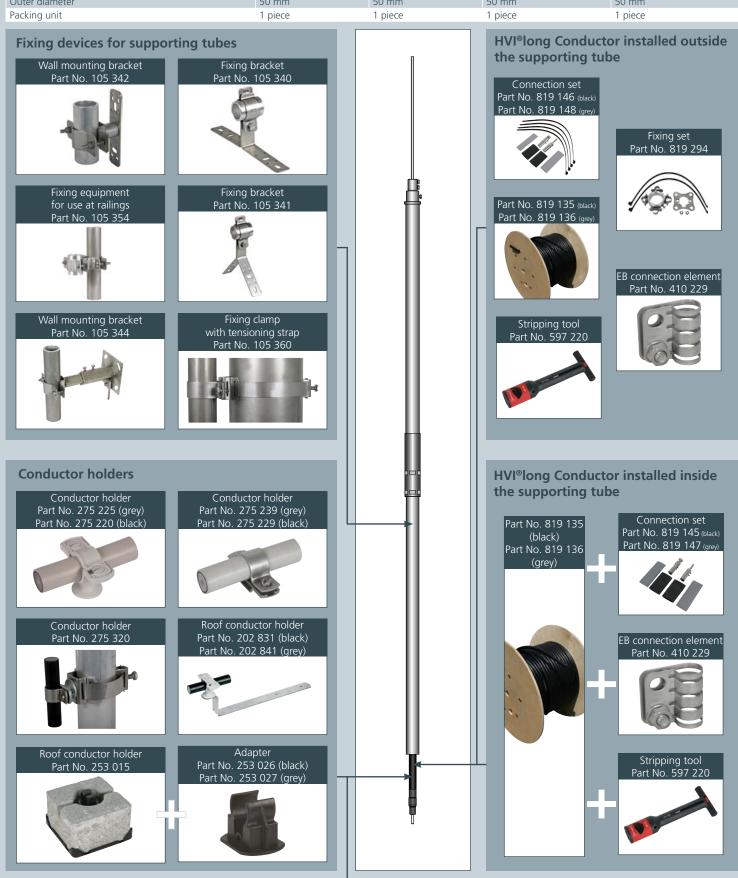


## **Technical properties – HVI®Conductors**

Technical properties	HVI®light	DEHNcon-H	HVI®Conductor	HVI®long	HVI®power	HVI®power long	
Structure		olid	solid / stranded		stranded		
Cross-section		mm²	19 mi		25 mm <sup>2</sup>		
Colour		c grey	black /		black		
Material of the inner conductor		pper	Сорр		Copper		
Outer diameter		mm	20 mm / 2 black /	23 mm	27 mm black		
Equivalent separation distance (air)	≤ 4	5 cm	≤ 75 (	cm	≤ 9	90 cm	
Equivalent separation distance (solid material)	≤ 9	0 cm	<u>&lt;</u> 150	≤ 150 cm		≤ 180 cm	
Minimum bending radius (OD = outer diameter)		x OD ) mm	10 x OD 200 / 230 mm black / grey		10 x OD 270 mm black		
Operating temperature	-30 °C	- +70 °C -30 °C − +70 °C		-50 °C – +70 °C			
Installation temperature	-5 °C − +40 °C		40 °C	-5 °C – +40 °C			
Tensile strength	95	50 N	950 N		1200 N		
UV / weather-resistant	)	res .	yes		yes		
Tested with I <sub>imp</sub> (10/350 µs)		H 100 kA DIN EN 50164-1	150 kA		200 kA		
For use in class of LPS (at $k_c = 1$ )	III	, IV	II, III, IV		I, II, III, IV		
Installation in Ex zone 1 and 21		_	possible			_	
Minimum order quantity	100 m	≥ 6 m	≥ 6 m	100 m	≥ 6 m	100 m	
Cable weight / 100 m	~ 4	10 kg	~ 48 kg (black) ~ 63 kg (grey)		~73 kg		

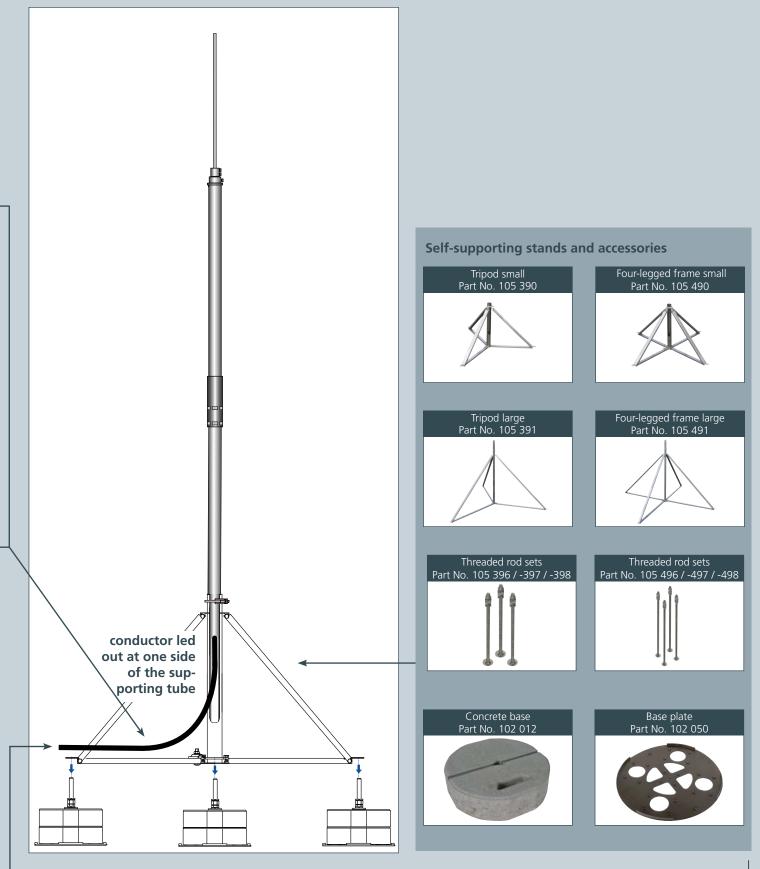
## **HVI®long Conductor: Accessories for wall mounting and earth entry**

Part No.	105 330	105 332	105 331	105 333
Material of the supporting tube	GRP / Al	GRP / Al	GRP / Al	GRP / Al
Length of the supporting tube	3200 mm	4700 mm	3200 mm	4700 mm
Length of the air-termination tip / rod	1000 mm / ø 10 mm	1000 mm / ø 10 mm	2500 mm / ø 22/16/10 mm	2500 mm / ø 22/16/10 mm
Outer diameter	50 mm	50 mm	50 mm	50 mm
Packing unit	1 piece	1 piece	1 piece	1 piece



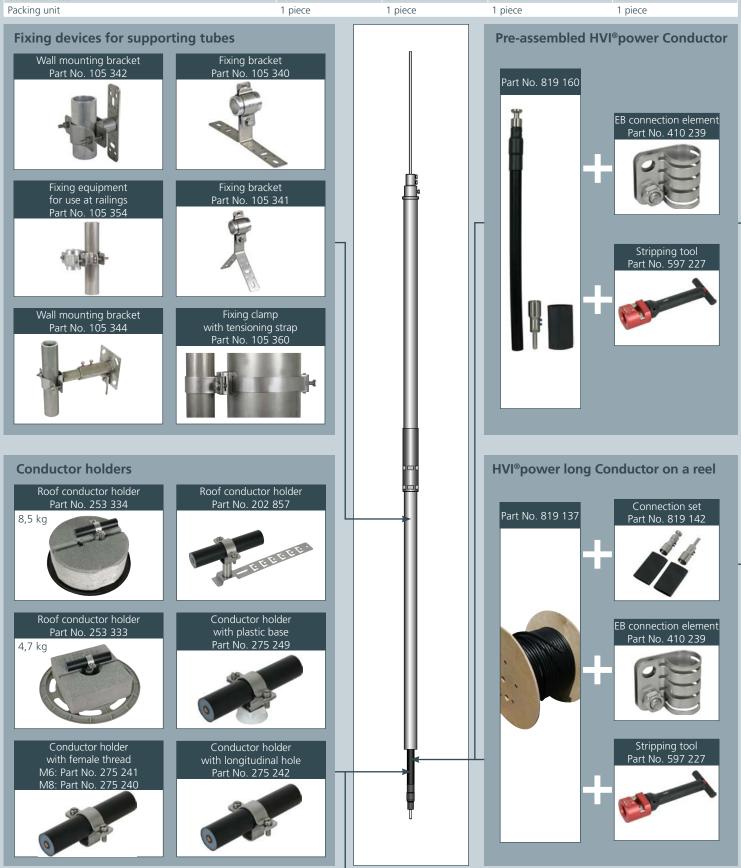
## **HVI®long Conductor installed in a tripod / four-legged frame**

Part No. air-termination mast	105 325	105 327	105 326	105 328
Material of the supporting tube	GRP / Al	GRP / Al	GRP / Al	GRP / Al
Length of the supporting tube	3200 mm	4700 mm	3200 mm	4700 mm
Length of the air-termination tip / rod	1000 mm/ø 10 mm	1000 mm / ø 10 mm	2500 mm / ø 22/16/10 mm	2500 mm / ø 22/16/10 mm
Outer diameter	50 mm	50 mm	50 mm	50 mm
Packing unit	1 piece	1 piece	1 piece	1 piece



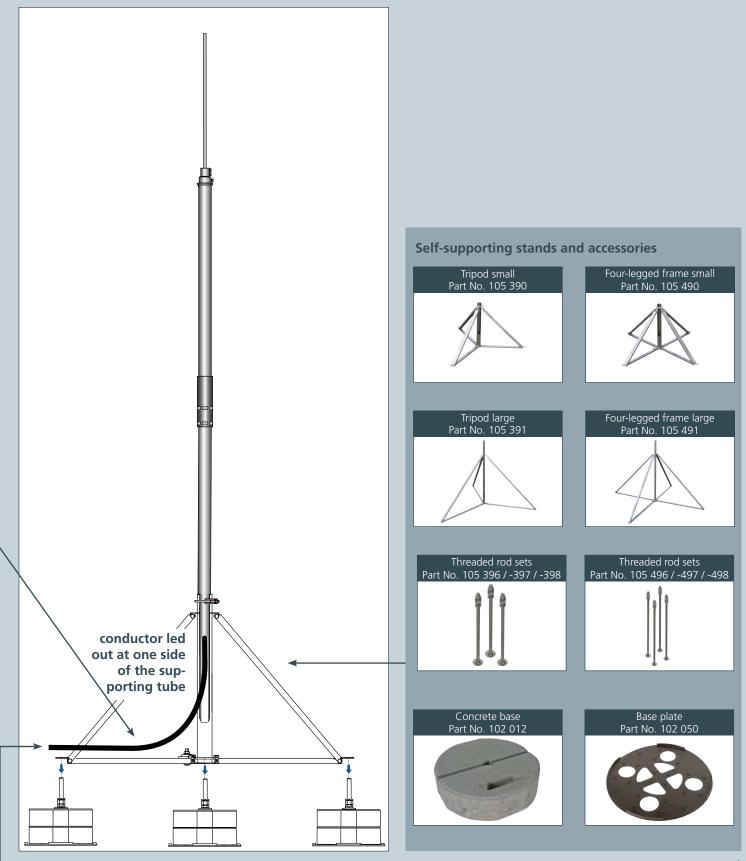
## HVI®power Conductor: Accessories for wall mounting and earth entry

Part No.	105 320	105 322	105 321	105 323
Material of the supporting tube	GRP / StSt	GRP / StSt	GRP / StSt	GRP / StSt
Length of the supporting tube	3500 mm	5000 mm	3500 mm	5000 mm
Length of the air-termination tip / rod	1000 mm / ø 10 mm	1000 mm / ø 10 mm	2500 mm / ø 22/16/10 mm	2500 mm / ø 22/16/10 mm
Outer diameter	50 mm	50 mm	50 mm	50 mm
Packing unit	1 piece	1 piece	1 piece	1 piece



## **HVI®power Conductor installed in a tripod / four-legged frame**

Part No. air-termination mast	105 392	105 394	105 393	105 395
Material of the supporting tube	GRP / StSt	GRP / StSt	GRP / StSt	GRP / StSt
Length of the supporting tube	3500 mm	5000 mm	3500 mm	5000 mm
Length of the air-termination tip / rod	1000 mm / ø 10 mm	1000 mm / ø 10 mm	2500 mm / ø 22/16/10 mm	2500 mm / ø 22/16/10 mm
Outer diameter	50 mm	50 mm	50 mm	50 mm
Packing unit	1 piece	1 piece	1 piece	1 piece





We are always there to assist you with our experience in the design, selection and application of insulated lightning protection systems with HVI®Conductors.

We shall be pleased to name you the right contact person of our subsidiaries or representatives. Please contact our International Sales Department:

Phone: +49 9181 906 1462 Fax: +49 9181 906 1444 E-mail: export@dehn.de

You will find more detailed information on HVI®Conductors as well as all components and accessories in our **Lightning Protection / Earthing main catalogue**.



Surge Protection Lightning Protection Safety Equipment DEHN protects. DEHN + SÖHNE GmbH + Co.KG.

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