

Photo: HELUKABEL®

Technical information



Cable accessories

Technical information

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Cable accessories

General information

Basic functions of a cable gland

Transferring cables and wires	<ul style="list-style-type: none">• Power (electricity)• Signals and data (current, voltage, light)
Cable protection	If a wire is to be connected in a housing, the housing must have a protective lead-through. Otherwise there is a danger that the wire will become damaged in case of movement.
Strain relief	A wire always moves to a greater or lesser extent – both during installation, and in long-term use. It is important to protect it against tensile loads. The movements may be either constant or intermittent. For this reason, a cable gland with strain relief is necessary. Strain reliefs are described in EN 50262. A distinction is made between retention, strain relief A and strain relief B. Generally, cable glands have strain relief A.
Protection classification	The lead-through in the wall of the housing must be sealed. This is described by ingress protection IP. The cable glands presented here have protection classification IP 68 – 5 bar. The 6 stands for “No dust penetration”, while the 8 stands for “Protected when permanently submerged in water” – this is tested at a water pressure of 5 bar (corresponds to 50 m water depth) for a duration of 30 min.
Seal with insert	A seal is compressed by tightening the cap nut. A particularly high quality seal and strain relief are achieved.
Sealing with clamping plates	When the cap nuts are screwed tight, lamellae press against the moulded seal – the wire is thereby sealed and the strain is relieved. The particular advantage of the clamping lamellae is that they make a large clamping range possible, to allow for different wire diameters.
Resistance	Different applications demand different degrees of resistance. Plastic cable glands made from polyamide can be used at a temperature range of between -30 °C and +80 °C. They are abrasion- and impact resistant as well as being resistant against hydrocarbons/fuels and cleaning agents. Stainless steel glands are suitable for heavy-duty use– they are waterproof and resistant to a large number of disinfectants used in food production. Brass glands are used when a long-lasting metal gland is required. Cable glands for EMC applications are also made from brass (EMC = Electro-magnetic Compatibility).
Compact design	<ul style="list-style-type: none">• No disassembly during final assembly. Simply loosening the cap nuts is sufficient.• No losing components• Quick assembly
Standard EN 50262	Cable glands are produced and tested according to the standard EN 50262. This stipulates the dimensions of the connection threads (“metric threaded connection”) as well as a series of safety-relevant parameters, e.g. strain relief. Cable glands are also available with another threaded connection (PG, NPT, etc.).
RoHS	Directive 2002/95/EC defines environment-relevant standards for electrical and electronic components and devices. This is known as RoHS for short: „Restriction of the use of certain hazardous substances in electrical and electronic equipment“. The use of heavy metals (lead, cadmium, etc.) and a number of other hazardous substances is forbidden.



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Installation notes

No disassembly

Disassembly of the glands HELUTOP® HT, HSK, Helufast, UNI-DICHT, KVA, SD are not necessary – provided that the cap nut is applied in such a way as to allow smooth running, there is no problem with subsequent insertion of the cable.

Screwing in

When screwing, observe the necessary tightening torque. If only one through-hole without thread is available, a lock nut must be used.

Protection classification

In order to achieve the desired protection classification even when working with an unfavourable surface, it may be necessary to use an O-ring or a connection thread gasket. To ensure a consistently high-quality seal, we recommend re-tightening the gland some time after assembly.

Lead through cable – turn cap nut – that's all there is to it!



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Approval to HELUTOP® HT

HELUTOP® HT-M cable gland from polyamide, metric thread

Approval certificate no. 138040

Approval certificate no. 134171

Type designation BM (corresponding to HELUTOP® HT-M)

For all products:

Temperature range: -20°C / +80°

Protection classification: IP 68 - 5bar (30min.)

Size metric	Sealing range mm	Clamping range of Strain relief mm	Category of Strain relief	Installation torque tested to EN 50262* Nm	Category of Impact effect
M12x1,5	3-6	3-6	A	1,7/2,5	2
M16x1,5	4-8	4-8	A	2,5/3,75	2
M16x1,5	5-10	5-10	A	2,5/3,75	2
M20x1,5	6-12	6-12	A	3,3/3,75	2
M20x1,5	10-14	10-14	A	3,3/3,75	2
M25x1,5	12-17	12-17	A	5,0/7,5	2
M25x1,5	13-18	13-18	A	5,0/7,5	2
M32x1,5	15-21	15-21	A	12/7,5	4
M32x1,5	18-25	18-25	A	12/7,5	4
M40x1,5	19-28	19-28	A	12/7,5	4
M40x1,5	22-31	22-31	A	12/7,5	4
M50x1,5	30-36	30-36	A	12/7,5	4
M63x1,5	34-44	34-44	A	12/7,5	4
M63x1,5	35-44	35-44	A	12/7,5	4

*Cap nut/gland and/or locknut

			VDE	UR/UL	CSA(US)		
Helutop HT	metrical	M12 - M16	VDE	-	CSA(US)		
		M20		UL			
		M32 - M63		-			
	PG	-					
	NPT	1/4" - 1"	-				
Helutop HT-R	metrical, reduced	M12 - M63	-	-	CSA(US)		
Helutop HT-BS	metrical	M12 - M16	VDE	-	CSA(US)		
		M20		UL			
		M32 - M63		-			
Helutop HT-K	metrical	M12 - M63	-	-	CSA(US)		
		PG	-				
		NPT	1/4" - 1"	-			
Helutop-HT-MS	metrical	M12 - M16	-	UR	-		
		M20 - M63		UL			
	PG	1/4" - 3/8"	-	-		-	
						1/2"	UR
						3/4" - 1"	UL
						-	
Helutop MS-EP	metrical	M12 - M16	-	UR	-		
		M20 - M63		UL			
	NPT	1/4" - 3/8"	-	-		UR	
						1/2"	UL
						3/4" - 1"	-
Helutop MS-E	PG		-	-	-		
Helutop HT-E	metrical	M12 - M16	-	UR	-		
		M20 - M63		UL			
	PG	1/4" - 3/8"	-	-		-	
						1/2"	UR
						3/4" - 1"	UL
						-	
Updated: 15 October 2007							

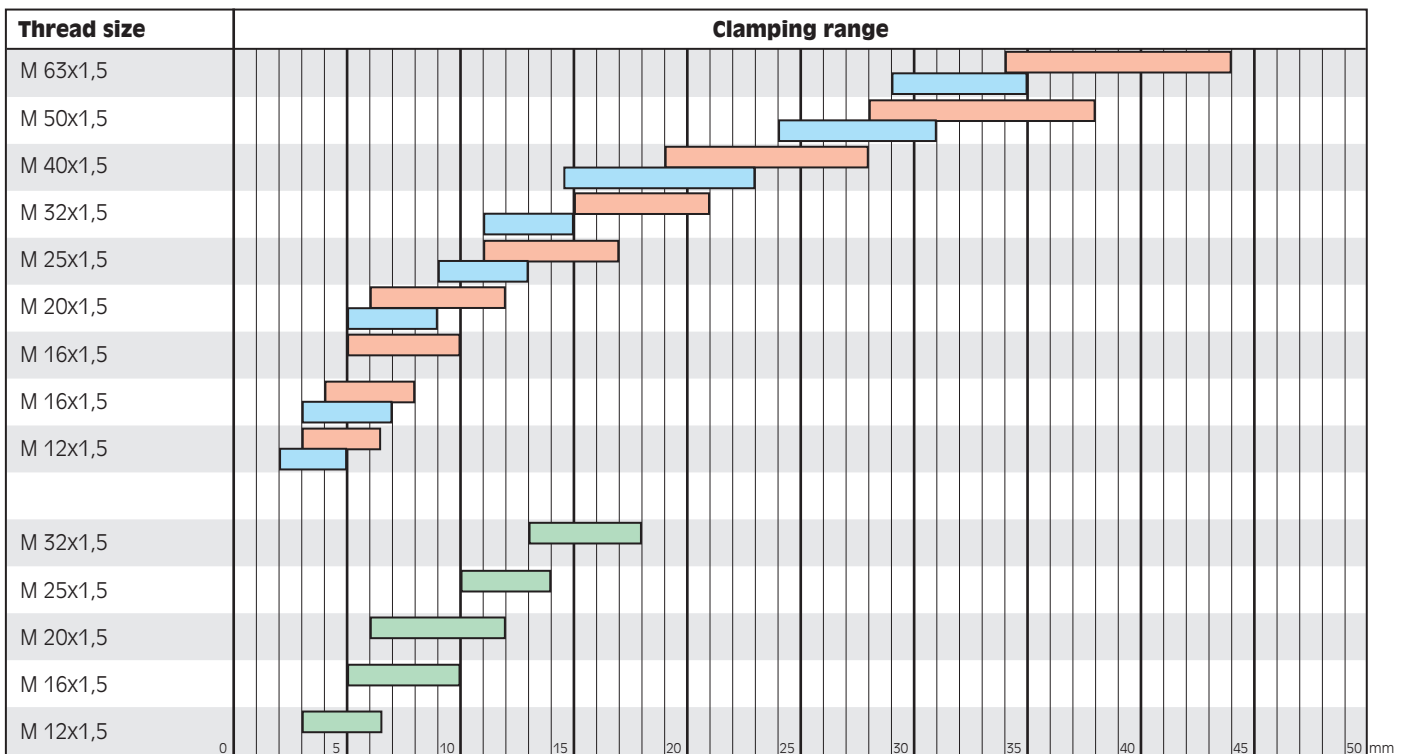


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Clamping ranges HELUTOP® HT

Clamping ranges

	Gland type		
	HELUTOP® HT HELUTOP® HT-BS HELUTOP® HT-E HELUTOP® HT-MS HELUTOP® HT-MS-EP	HELUTOP® HT-R HELUTOP® HT-MS-R	HELUTOP® HT-K
Thread size	Standard	reduced sealing	with anti-kink protection
M 12x1,5	3,0 - 6,5 mm	2,0 - 5,0 mm	3,0 - 6,5 mm
M 16x1,5	4,0 - 8,0 mm	3,0 - 7,0 mm	
M 16x1,5	5,0 - 10,0 mm		5,0 - 10,0 mm
M 20x1,5	6,0 - 12,0 mm	5,0 - 9,0 mm	6,0 - 12,0 mm
M 25x1,5	11,0 - 17,0 mm	9,0 - 13,0 mm	10,0 - 14,0 mm
M 32x1,5	15,0 - 21,0 mm	11,0 - 15,0 mm	13,0 - 18,0 mm
M 40x1,5	19,0 - 28,0 mm	14,5 - 23,0 mm	
M 50x1,5	28,0 - 38,0 mm	24,0 - 31,0 mm	
M 63x1,5	34,0 - 44,0 mm	29,0 - 35,0 mm	




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Protection Classifications to EN 60529

Definition of protection classifications to EN 60529

The protection classifications are indicated by a code, which always begins with the letters IP and ends with the number for the protection level, e.g. IP 54.

Protection level against solid foreign bodies			Protection level against water		
First number	Short description	Definition	Second number	Short description	Definition
0	Not protected	The object sensor, a 50 mm ball, must not fully penetrate.	0	Not protected	Vertically-falling droplets must not have a damaging effect.
1	Protected against solid foreign bodies of 50 mm diameter and larger	The object sensor, a 12.5 mm ball, must not fully penetrate.	1	Protected against dripping water	Vertically-falling droplets must not have a damaging effect if the housing is tilted by an angle of up to 150 on both sides of the perpendiculars.
2	Protected against solid foreign bodies of 12.5 mm diameter and larger	The object sensor, a 2.5 mm diameter ball, must not penetrate at all.	2	Protection against dripping water if the housing is tilted by up to 150.	Water sprayed at both sides of the perpendiculars at an angle of up to 60° must not have a damaging effect.
3	Protected against solid foreign bodies of 2.5 mm diameter and larger	The object sensor, a 2.5 mm diameter ball, must not penetrate at all.	3	Protected against spray water	Water sprayed against the housing from one direction must not have a damaging effect.
4	Protected against solid foreign bodies of 1.0 mm diameter and larger	The object sensor, a 1.0 mm diameter ball, must not penetrate at all.	4	Protected against spray water	Water sprayed against the housing in a jet from every direction must not have a damaging effect.
5	Dust protected	Dust penetration is not prevented completely. The amount of penetration, however, must not impair the function or safety of the device.	5	Protected against	Water sprayed against the housing in a strong jet from every direction must not have a damaging effect.
6	Dust protected	No dust penetration	6	Protected against strong hose water	Water sprayed against the housing in a strong jet from every direction must not have a damaging effect.
Example: Letters  First index: Protection against contact and penetration by foreign bodies Second index: Protection against liquid			7	Protected against the effect when temporarily submerged under water	The volume of penetrating water must not have a damaging effect when the housing is temporarily submerged under water at a certain pressure.
			8	Protected against the effect when permanently submerged under water	The volume of penetrating water must not have a damaging effect when the housing is permanently submerged under water.
			9k	Protected against the effect of water from high-pressure cleaners.	Water sprayed against the enclosure in a jet at increased pressure from every direction must not have any damaging effects.



Cable accessories

Description of Fire Protection acc. to UL 94

Description of Fire Protection acc. to UL 94

Fire protection HB

In the horizontal combustion test, the material combusts slowly. Must not exceed a combustion speed of 3 inch/min. up to 3 mm wall thickness and 1.5 inch/7 min at over 3 mm wall thickness. Materials exceeding this combustion speed are not UL listed.

Fire protection V2

In the vertical combustion test, the material must self-extinguish after an average of 25 seconds (no single values over 30 seconds). Material drips can ignite wool placed underneath it. The afterglow, however, must not exceed 60 seconds.

Fire protection V1

In the vertical combustion test, the material must also self-extinguish after an average of 25 seconds (no single values over 30 seconds). By contrast, any drips must not ignite the wool. The afterglow must not exceed 30 seconds.

Fire protection V0

In the vertical combustion test, the material must self-extinguish in less than an average of 5 seconds (no single values over 10 seconds). Any drips must not ignite wool and the afterglow must not exceed 30 seconds.



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Size Comparison and PG/Metric Installation Dimensions

Nominal size	Outer diameter	Through-hole
PG threaded connection to DIN 40430		
PG7	12,5	12,7
PG9	15,2	15,4
PG11	18,6	18,8
PG13,5	20,4	20,6
PG16	22,5	22,7
PG21	28,3	28,5
PG29	37,0	37,2
PG36	47,0	47,2
PG42	54,0	54,2
PG48	59,3	59,5

Metric threaded connections to EN 60423		
M12x1,5	12,0	12,5
M16x1,5	16,0	16,5
M20x1,5	20,0	20,5
M25x1,5	25,0	25,5
M32x1,5	32,0	32,5
M40x1,5	40,0	40,5
M50x1,5	50,0	50,5
M63x1,5	63,0	63,5

American pipe thread NPT (conical)		
1/4"	13,616	
3/8"	17,055	
1/2"	21,223	
3/4"	26,568	
1"	33,227	
1 1/4"	41,984	
1 1/2"	48,053	
2"	60,091	
2 1/2"	72,699	
3"	88,608	
3 1/2"	100,013	

Gas pipe thread BSP (British Standard Pipe)		
1/4"	13,157	13,4
3/8"	16,662	17,0
1/2"	20,955	21,3
5/8"	26,441	26,8
1"	33,249	33,7
1 1/4"	41,910	42,2
1 1/2"	47,803	48,3
2"	59,614	60,2
2 1/2"	75,184	75,5
3"	87,884	88,5
3 1/2"	100,330	101,0
4"	113,050	114,0



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Comparison of Widths / Installation Dimensions

Width in mm	Width across corners "E"
9	10,4
11	12,5
13	14,9
14	16,0
15	17,1
16	18,2
17	19,4
19	22,0
20	22,7
21	23,9
22	25,0
24	27,3
27	30,6
28	30,6
29	31,8
30	34,0
32	36,2
33	37,2
36	40,5
37	41,5
39	44,0
40	45,2
41	46,1
42	47,0
45	51,2
46	52,5
47	53,5
50	58,3
53	60,0
54	61,0
55	62,0
57	64,4
60	67,5
64	72,3
65	73,1
66	74,5
67	75,5

***Installation dimension "E" corresponds to the width across corners of the hexagon + assembly allowance



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Size Comparison AWG / mm

AWG-no.	Cross-section	Diameter mm
500	253	17,96
350	177	15,03
250	127	12,07
4/0	107,2	11,68
3/0	85,0	10,40
2/0	67,5	9,27
1/0	53,5	8,25
1	42,4	7,35
2	33,6	6,54
4	21,2	5,19
6	13,3	4,12
8	8,37	3,26
10	5,26	2,59
12	3,51	2,05
14	2,08	1,63
16	1,31	1,29
18	0,823	1,024
20	0,519	0,813
22	0,324	0,643
24	0,205	0,511
26	2,128	0,405
28	0,0804	0,320
30	0,0507	0,255
32	0,0324	0,203
34	0,0200	0,160
36	0,0127	0,127
40	0,00487	0,079
42	0,00317	0,064
44	0,00203	0,051

Inch/mm conversion

Inches	mm
1/8	3,2
1/4	6,4
3/8	9,5
1/2	12,7
3/4	19,0
1	25,4
1 1/4	31,8
1 1/2	38,0
2	50,8
2 1/2	64,0
3	76,0
4	101,6



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