IP68 Quick connection system

IP68 Quick connection system

Woertz IP 3G2.5 mm² and Woertz IP 3G4 mm²

A high protection degree, short installation procedures, easy handling and expansion possibilities are the main features of the system: anytime, anywhere, IP68 protected.

Where are these flat cables used?

- In installations related to stringent requirements. Its high protection degree allows this system to be used in tunnels, where many connections have to be made. Thanks to the rapid installation substantial time savings will be performed.
- Flexibility and robustness make the system ideal for building constructions, public works and open cast works in both construction and exploitation phases.
- In industrial washing plants, car wash sites or cleaning installations for tunnels or underground parking where powerful jets of water are used.
- The reliable components also suit outdoor applications such as market places, trade fairs and openair events.
- IP66/68 allows not only the use in wet but also in dusty environment. The system therefore suits workshops, joineries or industrial plants.
- No need to seal the connecting boxes or to sever the cable, new potential sources of errors are thus avoided.

Flat cable enables installations to be completed easily with further connections anywhere, anytime.

Woertz IP 3G2.5 mm²

flat cable IP 3G2.5 mm²

		PVC		halogen-free	
		No.	Eldas-No.	**No.**	Eldas-No.
 L+N+PE		**49685**		**49686**	
Technical data					
Dimensions	mm	16.5×6		16.5×6	
Weight	g/m	185		185	
Fire load	kWh/m	0.583		1.02	
No. of leads x cross-section	mm²	3×2.5		3×2.5	
Power current part					
Copper conductors		tinned, highly flexible		tinned, highly flexible	
Insulation of the leads		PVC oil resisting		vulcanized, flame retardant polyethylene	
Colour of the leads		brown, green/yellow, blue		brown, green/yellow, blue	
Cross-section	mm²	2.5		2.5	
Test voltage	kV / Hz	4 / 50		4 / 50	
Rated voltage	kV	0.6/1		0.6/1	
DC-resistance	Ω/km	7.98		7.98	
Cu weight	kg/km	72		72	

Woertz IP 3G4 mm²

flat cable IP 3G4 mm²

		PVC		halogen-free	
		No.	Eldas-No.	**No.**	Eldas-No.
 L+N+PE				**49646**	
Technical data					
Dimensions	mm			16.5×6	
Weight	g/m			224	
Fire load	kWh/m			0.95	
No. of leads x cross-section	mm²			3×4	
Power current part					
Copper conductors				tinned, highly flexible	
Insulation of the leads				vulcanized, flame retardant polyethylene	
Colour of the leads				brown, green/yellow, blue	
Cross-section	mm²			4	
Test voltage	kV / Hz			4 / 50	
Rated voltage	kV			0.6/1	
DC-resistance	Ω/km			5.09	
Cu weight	kg/km			116	

Woertz IP 3G2.5 mm² and Woertz IP 3G4 mm²

Woertz Quick connection technique to flat cable No. 49685, 49686 and 49646

IP68 box to flat cable

No.	Eldas-No.
48243/L/68	150 701 467

Technical data

L×W×H mm	120×30.5×42.5
Fire load kWh	0.29
Fire behaviour	UL 94-V0
Rated voltage V/Hz	690/50
Test current A	24
Cable gland thread	M16×1.5
Installation temperature min.	+5 °C
Packing unit pce.	5
Degree of protection	IP66/IP68 (2 m, 30 min)

Woertz patented piercing technique, without any tool

Protection IP68 (single contacting) / Protection IP40 (multiple contacting)

tightening torque Nm	0.7
screwdriver No.	1

IP68 LED box to flat cable

No.
48243/LED/230V

Technical data

L×W×H mm	17.5×30.5×54.5
Power consumption W	7
Luminous flux lm	380
Colour temperature K	5000
max. ambient temperature °C	80
Angle of radiation °	120
Supply voltage VAC	230
Current consumption mA	30
Packing unit pce.	5

Light source (Light emitting diode), LED

Colour of light white

Degree of protection IP65/IP68 (2 m, 30 min)

Cable glands

No.	Eldas-No.
48560/01/M16	121 682 507
48560/03/M16	121 682 517
48560/05/M16	121 682 527

Technical data

Diameter of cables M16×1.5 mm	4.5-6.0
	6.0-8.0
	8.0-10.5
Packing unit pce.	5

of polyamide, grey

delivered with O-ring seal of NBR

halogen-free

Woertz IP 3G2.5 mm² and Woertz IP 3G4 mm²

Accessories

End piece without stripping		Technical data		
No.	Eldas-No.	LxWxH mm	40×25×15	of polycarbonate, halogen-free; silicone gel
48510/03	120 900 307	Weight g		
		Fire load kWh	na	Note:
		Packing unit pce.	8	Cut neatly both ends of the cable before mounting the end pieces. No need to strip the cable. Cable end piece may only be mounted once..
		Degree of protection	IP68	

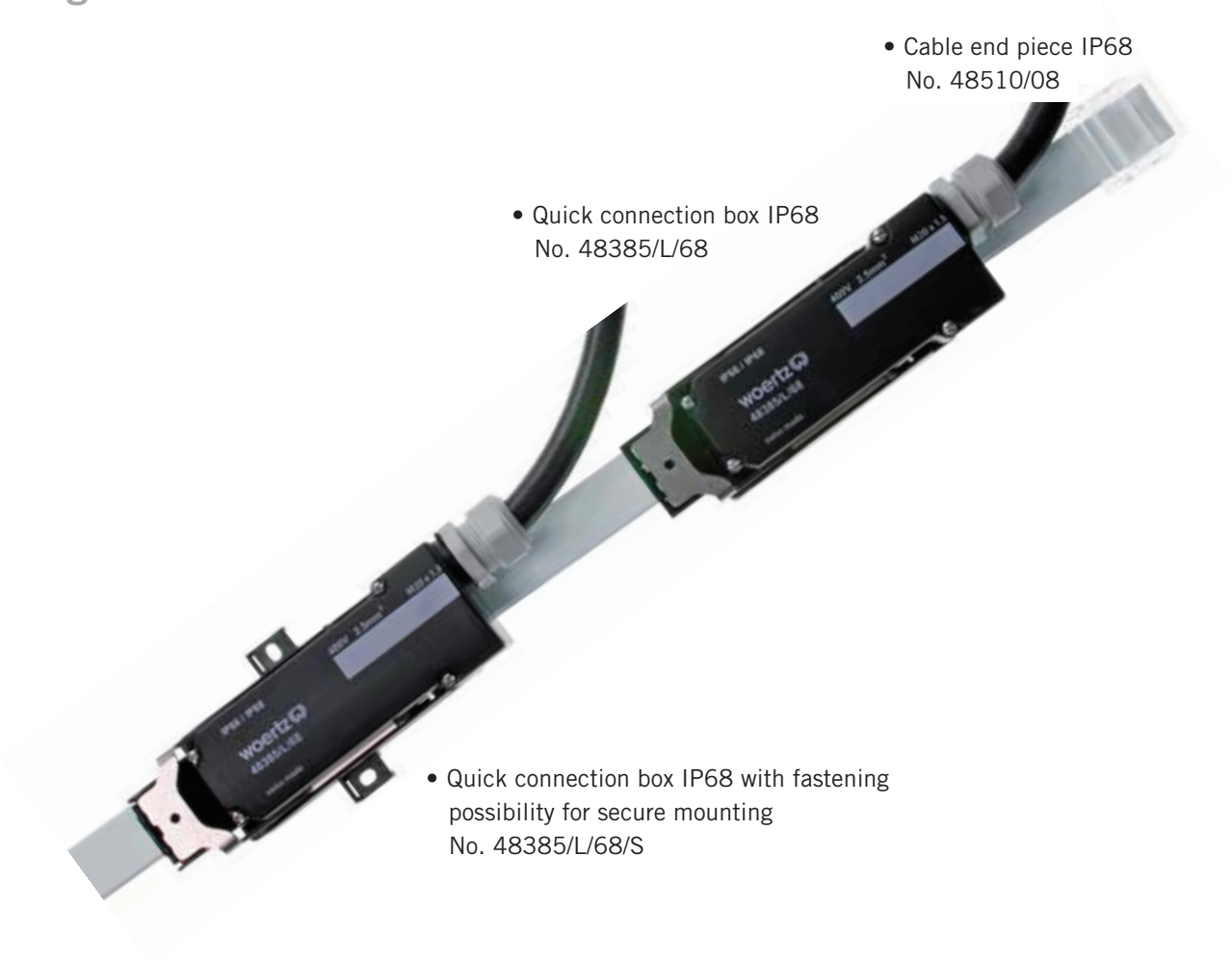
Clamp		Technical data		
No.	Eldas-No.	LxWxH mm	31×10×8.5	of polyamide 6.6, halogen-free, grey
49693	120 008 607	Fire load kWh	0.01	
		Packing unit pce.	100	

Shears		Technical data		
No.	Eldas-No.	Packing unit pce.	1	For cutting neatly and easily every type of flat cables (max. width 32mm).
49930	983 045 007			
				With sliding anvil. Teflon coated blades.

Insulating tape		Technical data		
No.	Eldas-No.	Dimension mm	102×100×2.3	To reinsulate correctly the holes due to pointed screws or cutting teeth when removing or displacing connections.
49960	171 013 004	Dielectric strength max. kV/mm	23	
		Temperature max. °C	+70	
		Packing unit m	10	Weatherproof, self-fusing.

Woertz power IP 5G2.5 mm²

Every connection you need where you need it…
Hard conditions don‘t affect products with a high IP protection degree…



• Cable end piece IP68
No. 48510/08

• Quick connection box IP68
No. 48385/L/68

• Quick connection box IP68 with fastening possibility for secure mounting
No. 48385/L/68/S

Where are these flat cables used?

- In installations related to stringent requirements. Its high protection degree allows this system to be used in tunnels, where many connections have to be made. Thanks to the rapid installation substantial time savings will be performed.
- Flexibility and robustness make the system ideal for building constructions, public works and open cast works in both construction and exploitation phases.
- Three-phase loads may be supplied through this system. The lamps are distributed over the different pole conductors and individually switched.
- In industrial washing plants, car wash sites or cleaning installations for tunnels or underground parking where powerful jets of water are used.
- IP66/68 allows not only the use in wet but also in dusty environment. The system therefore suits workshops, joineries or industrial plants.
- No need to seal the connecting boxes or to sever the cable, new potential sources of errors are thus avoided.

Flat cable enables installations to be completed easily with further connections anywhere, anytime.

Woertz power IP 5G2.5 mm²

flat cable IP 5G2.5 mm²

	halogen-free
	No. Eldas-No.
	**49863/FRNC** 150 710 317
3 L+N+PE	

Technical data			
Dimension	mm		24×6
Weight	g/m		247
Fire load	kWh/m		0.671
No. of leads x cross-section	mm²		5×2.5
Power current part			
Copper conductors			tinned, highly flexible
Insulation of the leads			vulcanized and flame retardant polyethylene
Colour of the leads			grey, black, brown, blue, green/yellow
Cross-section	mm²		2.5
Test voltage	kV / Hz		4 / 50
Rated voltage	kV		0.6/1
DC-resistance	Ω/km		7.98
Max. operating temperature			-15 °C bis +90 °C
Min. Installation temperature			+5 °C
Bending radius			min. 6× cable thickness
Cu weight	kg/km		120

Connecting box for IP68 applications

Supply and pre-wired connector

Box		**Technical data**		
No.	Eldas-No.	LxWxH without cable gland mm	155×50×55	mounting without any tool
48385/L/68	150 710 407	LxWxH with fastening facility mm	155×75×55	
		Fire load kWh	0.74	Thread of cable gland: M20×1.5
		Fire behaviour	UL 94-V0	
		Connecting capacity mm	3.0×3.5	Fastening (screws or cable ties)
		Cross-section mm²	2.5	
		Cross-section with Litzenhülse mm²	4	
		Rated voltage V/Hz	400/50	
		Test voltage kV/Hz	4 / 50	
		Test current power max. A	24	
		Packing unit pce.	1	
Fastening:				
48385/L/68/S	150 710 417			
		Degree of protection	IP65/IP68 (2 m, 30 min)	

Accessories

End piece without stripping

No.	Eldas-No.
48510/05	120 900 617

Technical data		
L×W×H mm	40×36×16	of polycarbonate, halogen-free; silicone gel
Weight g	14.3	
Fire load kWh	n.a.	Note:
Packing unit pce.	5	Cut neatly both ends of the cable before mounting the end pieces. No need to strip the cable.
Degree of protection	IP68	Cable end piece may only be mounted once.

Cable fastening clamp

No.	Eldas-No.
49731	120 008 107

Technical data		
L×W×H mm	52×10×10	for cable fastening
Weight g	2	
Fire load kWh	0.02	of polyamide 6.6, halogen-free
Packing unit pce.	100	

Clamp for screwing on

No.	Eldas-No.
49733	150 900 117
49733A	150 900 107

Technical data		
L×W×H mm	40×15×15	**49733** for screwing on
Weight g	3.7	**49733A** for sticking on
Fire load kWh	0.03	
Packing unit pce.	100	of polyamide 6.6, halogen-free

Shears

No.	Eldas-No.
49930	983 045 007

Technical data		
Weight g	223	For cutting neatly and easily every type of flat cables (max. width 32mm).
Packing unit pce.	1	
		With sliding anvil. Teflon coated blades.

Insulating tape

No.	Eldas-No.
49960	171 013 004

Technical data		
L×W×H mm	102×100×2.3	To reinsulate correctly the holes due to pointed screws or cutting teeth when removing or displacing connections.
Weight g	33	
Dielectric strength max. kV/mm	23	
Temperature max. °C	70	
Packing unit pce.	10	Weatherproof, self-fusing.

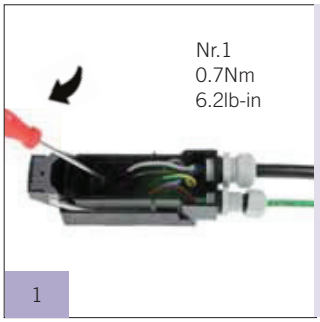
Cable glands

No.	Eldas-No.
48560/03/M20	121 682 607
48560/05/M20	121 682 617

Technical data		
		of polyamide, grey
Diameter of cables mm	8.0-11.0	M20×1.5
	11.0-15.0	
		delivered with O-ring seal of NBR
Packing unit pce.	5	halogen-free

Mounting procedure of the connecting box No. 48385/L/68

(can be used for supply and branching!)



1

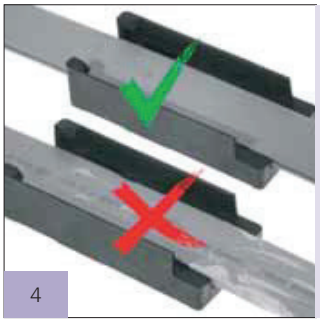
Open the cover. Put the cable gland on the round cable. Cut the round cable to the desired length and remove the sheath. Introduce the leads after having stripped off the insulation and tighten the clamping screws. Check if the O-ring seal is at the right position and tighten the cable gland.

2

Mount the cover again.

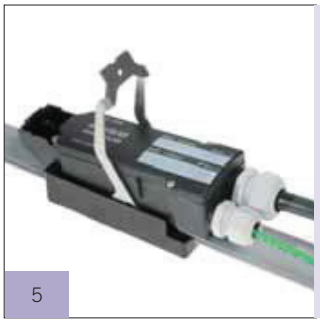
3

Position the base of the connecting box and screw it on to its support if required.



4

Position the asymmetric fl at cable (right position is shown by the groove in one narrow side of the cable sheath). Is the fl at cable not in the right position, it cannot be inserted into the base. The cable has to be clean, undamaged, free from grease and oil residue.



5

Snap together the upper part and the base.

6

Fold back the lever. It must audibly click into place. The box is thus connected and locked. It is also possible to secure the lever by using the supplied screw. The cover may be marked if necessary.

Possibility of pre-wiring:

Service to our customers.

On request the connecting boxes may be provided in advance with round outgoing cables.

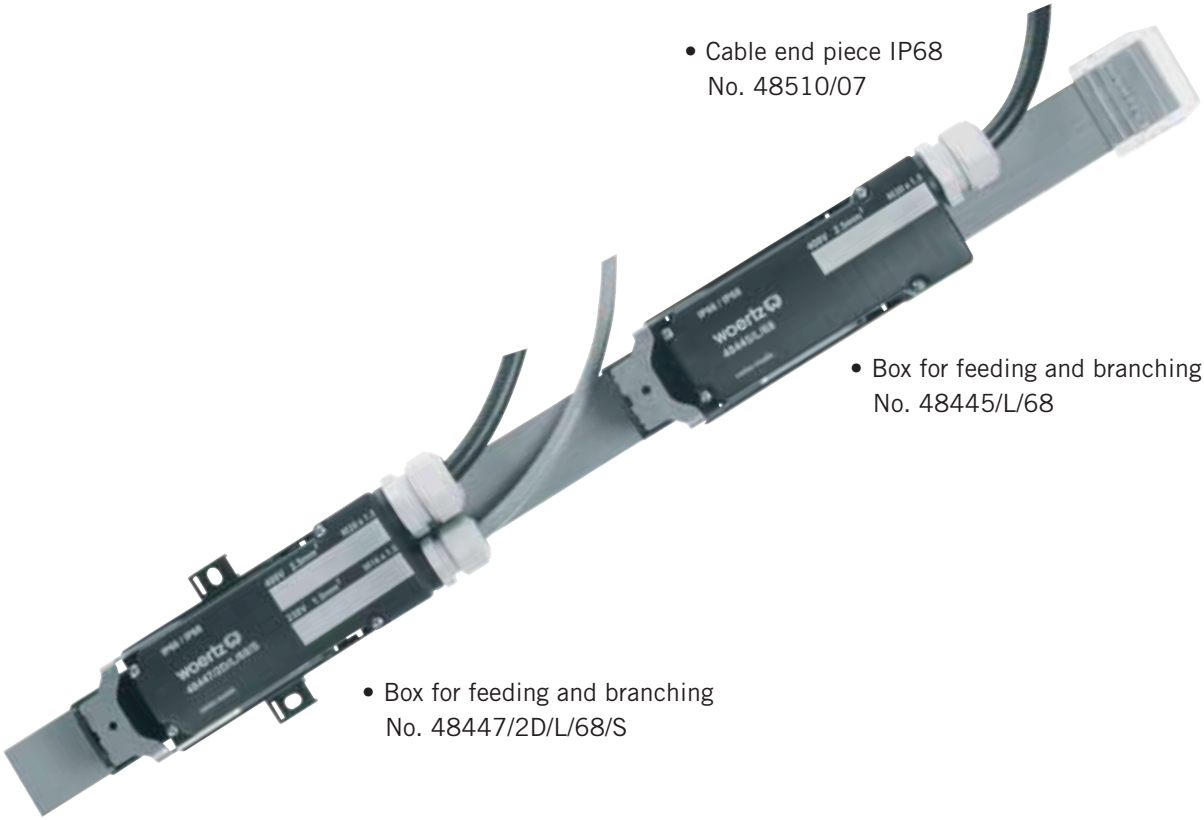
The overcurrent protection devices will be chosen in relation to the length of installed cables so that their response time conform to specifi cations in case of malfunction.

The box has only to be connected to the cable once. If the box has to be displaced, the protection degree of the system will no more be fulfi lled. However the box may be used as IP40 box. It is absolutely necessary to reinsulate correctly the holes due to the cutting teeth by means of the insulating tape, in order to ensure the IP protection degree. We do not assume liability for defects occuring through improper operation!

A high IP protection degree requires the highest demands on the installation material. The Woertz System guarantee only applies to original products fi nished in our workshops (such as fl at cables, boxes and accessories) or provided by appropriate, controlled suppliers.

Woertz combi IP 5G2.5 mm² + 2×1.5 mm²

For the first time bus technology finds application under more stringent requirements. Power current conductors and bus conductors are moulded here in a single cable sheath.



- Cable end piece IP68
  No. 48510/07
- Box for feeding and branching
  No. 48445/L/68
- Box for feeding and branching
  No. 48447/2D/L/68/S

Where is this flat cable system used?

- Three-phase loads may be supplied through this system. The same cable may also carry bus data.
- The flat cable ecobus combi with shielded bus cable finds broad application in the KNX technology for instance; power bus systems like DALI may be fed through the ecobus combi flat cable with unshielded bus cable.
- Flexibility and robustness make the system ideal for building constructions, public works and open cast works in both construction and exploitation phases.
- For the first time bus technology finds application under more stringent requirements. The high protection degree enables for instance DALI light control to be used in street tunnels.
- In industrial washing plants, car wash sites or cleaning installations for tunnels or underground parking where powerful jets of water are used.
- IP66/68 allows not only the use in wet but also in dusty environment. The system therefore suits workshops, joineries or industrial plants.
- No need to seal the connecting boxes or to sever the cable, new potential sources of errors are thus avoided.

Flat cable enables installations to be completed easily with further connections anywhere, anytime.

Woertz combi IP 5G2.5 mm² + 2×1.5 mm² - **without shield**

flat cable combi IP 5G2.5 mm² + 2×1.5 mm²

		PVC		halogen-free	
		No.	Eldas-No.	**No.**	Eldas-No.
				**49864/FRNC**	
3L+N+PE+2 bus without shield					
Technical data					
Dimension	mm			33×6	
Weight	g/m			340	
Fire load	kWh/m			1.9	
No. of leads x cross-section	mm²			5×2.5 + 2×1.5	
Power current part					
Copper conductors				CU tinned, class 5	
Insulation of the leads				vulcanized and flame retardant polyethylene	
Colour of the leads				grey, black, brown, blue, yellow/green	
Cross-section	mm²			2.5	
Test voltage	kV / Hz			4 / 50	
Rated voltage	kV			0.6/1	
DC-resistance	Ω/km			7.98	
Cu weight	kg/km			120	
Bus part					
Copper conductors				CU tinned, class 5	
Insulation of the leads				vulcanized and flame retardant polyethylene	
Colour of the leads				neutral	
Cross-section	mm²			1.5	
Test voltage	kV / Hz			4 / 50	
Rated voltage	V			230	
Max. rated current	A			3	
DC-resistance	Ω/km			13.3	
Capacitance	pF/m			70	
Attenuation at 1Hz	dB/100m			1.2/100	
Charact. impedance at 1 MHz	nom Ω			nom. 75	
max. operating temperature				-15 °C to +90 °C	
min. Installation temperature				+5 °C	
Cu weight	kg/km			29	

Woertz combi IP 5G2.5 mm² + 2×1.5 mm² - **without shield**

Boxes for feeding and branching, for IP68 applications

Feeding and branching box		Technical data			
No.	Eldas-No.	Weight g	210	No. of leads x cross-section mm²	5×2.5
48445/L/68	150 703 707	L×W×H mm,without cable gland	155×50×55	Cross-section of wires with end sleeves mm²	4
		L×W×H mm, with fastening facility	155×75×55	Test current power power current part A	24
		Fire load kWh	0.74	Test voltage kV/Hz	4 / 50
		Fire behaviour	UL 94-V0	Rated voltage Power current V/Hz	400/50
		Connecting capacity mm	3.0×3.5	Thread of cable gland	M20×1.5
with fastening facility:		Plastic parts	halogen-free		
No.	Eldas-No.	Metal parts	corrosion-resistant	tightening torque Nm	0.7
48445/L/68/S	150 703 717	Degree of protection	IP65/IP68 (2 m, 30 min)	screwdriver No.	1

Feeding and branching box		Technical data			
No.	Eldas-No.	Weight g	210	No. of leads x cross-section mm²	5×2.5+2×1.5
48447/2D/L/68	150 703 607	L×W×H mm, without cable gland	155×50×55	Cross-section of wires with	
		L×W×H mm, with fastening facility	155×75×55	end sleeves mm²	4 + 1.5
		Fire load kWh	0.74	Test current power power current part A	24
		Fire behaviour	UL 94-V0	Test voltage kV/Hz	4 / 50
		Connecting capacity mm	3.0×3.5	Rated voltage Power current V/Hz	400/50
with fastening facility:		Plastic parts	halogen-free	Rated voltage bus V/Hz	230/50
No.	Eldas-No.	Metal parts	corrosion-resistant	Max. rated current bus part A	3
48447/2D/L/68/S	150 703 617	Degree of protection	IP65/IP68 (2 m, 30 min)	Thread of cable gland	M20×1.5 & M16×1.5
				tightening torque Nm	0.7
				screwdriver No.	1

Woertz combi IP 5G2.5 mm² + 2×1.5 mm²

Accessories

Cable end piece		Technical data		
No.	Eldas-No.	LxWxH mm	40×44×16	of polycarbonate, halogen-free; silicone gel
48510/07	120 900 607	Weight g	16.8	
		Fire load kWh	n.a.	Note:
		Packing unit pce.	4	Cut neatly both ends of the cable before mounting the end pieces. No need to strip the cable.
		Degree of protection	IP68	Cable end piece may only be mounted once.

Cable fastening clamp		Technical data		
No.	Eldas-No.	LxWxH mm	52×10×10	for cable fastening
49731	120 008 107	Weight g	2	
		Fire load kWh	0.02	of polyamide 6.6, halogen-free
		Packing unit pce.	100	

Clamp for screwing on		Technical data		
No.	Eldas-No.	LxWxH mm	40×15×15	**49733** for screwing on
49733	150 900 117	Weight g	3.7	**49733A** for sticking on
49733A	150 900 107	Fire load kWh	0.03	
		Packing unit pce.	100	of polyamide 6.6, halogen-free

Shears		Technical data		
No.	Eldas-No.	Weight g	223	for cutting neatly and easily every type of flat
49930	983 045 007	Packing unit pce.	1	cables (max. width 32mm).
				With sliding anvil. Teflon coated blades

Insulating tape		Technical data		
No.	Eldas-No.	LxWxH mm	102×100×2.3	to reinsulate correctly the holes due to cutting
49960	171 013 004	Weight g	33	teeth when removing or displacing connec-
		Dielectric strength max. kV/mm	23	tions.
		Temperature max. °C	+70	
		Packing unit pce.	10	Weatherproof, self-fusing.

Cable glands		Technical data		
No.	Eldas-No.			of polyamide, grey
48560/01/M16	121 682 507	Diameter of cables M16×1.5 mm	4.5-6.0	
48560/03/M16	121 682 517		6.0-8.0	delivered with O-Ring seal of NBR
48560/05/M16	121 682 527		8.0-10.5	
48560/03/M20	121 682 607	Diameter of cables M20×1.5 mm	8.0-11.0	halogen-free
48560/05/M20	121 682 617		11.0-15.0	
		Packing unit pce.	5	

Woertz power IP 5G6 mm²

Every connection you need where you need it... Hard conditions don‘t affect products with a high IP protection degree...

• Quick connection box IP68
No. 48785/L/68

• Quick connection box IP68 with fastening possibility for secure mounting
No. 48785/L/68/S

Where are these flat cables used?

- In installations related to stringent requirements. Its high protection degree allows this system to be used in tunnels, where many connections have to be made. Thanks to the rapid installation substantial time savings will be performed.
- Flexibility and robustness make the system ideal for building constructions, public works and open cast works in both construction and exploitation phases.
- In industrial washing plants, car wash sites or cleaning installations for tunnels or underground parking where powerful jets of water are used.
- The reliable components also suit outdoor applications such as market places, trade fairs and openair events.
- IP66/68 allows not only the use in wet but also in dusty environment. The system therefore suits workshops, joineries or industrial plants.
- No need to seal the connecting boxes or to sever the cable, new potential sources of errors are thus avoided.

Flat cable enables installations to be completed easily with further connections anywhere, anytime.

Woertz power IP 5G6 mm²

flat cable IP 5G6 mm²

	PVC		halogen-free	
	No.	Eldas-No.	**No.**	Eldas-No.
 3L+N+PE			**48780/FRNC**	
Technical data				
Dimensions	mm		32×7.5	
Weight	g/m		510	
Fire load	kWh		1.8	
No. of leads x cross-section	mm²		5×6	
Power current part				
Copper conductors			tinned, class 5	
Insulation of the leads			vulcanized, flame retardant polyethylene	
Colour of the leads			grey, black, green/yellow, blue, brown	
Cross-section	mm²		6	
Test voltage	kV / Hz		4 / 50	
Rated voltage	kV		0.6/1	
DC-resistance	Ω/km		3.39	
Cu weight	kg/km		288	

Flat cable boxes for IP68 application

Feeding and branching box

Box		Technical data		
No.	Eldas-No.	LxWxH without cable gland mm	155×50×55	may be mounted without any tool
48785/L/68		LxWxH with fastening facility mm	155×75×55	Thread of cable glands: M20×1.5
		Fire load kWh	0.74	
		Fire behaviour	UL 94-V0	Fastening facility by means of screws and cable ties
		Connecting capacity mm	3.0×3.5	
		Cross-section mm	2.5	
		Cross-section with Litzenhülse mm	4	
		Rated voltage V/Hz	400/50	
		Test voltage V/Hz	4 / 50	
		Test current power max. A	24	
		Weight g	210	
		Packing unit pce.	1	
fastening facility: 48785/L/68/S		Degree of protection	IP65/IP68 (2 m, 30 min)	

Accessories

Heat-shrinkable end cap	Technical data		
No.	L×Ø mm	77×26	Provided with adhesive and sealing compound inside
48511/24	Weight g	10.6	
	Packing unit pce.	5	*Note:* Cut neatly both ends of the cable before mounting the end pieces. No need to strip the cable
	Degree of protection	IP68	may only be mounted once.

Cable clamp for screwing on		Technical data		
No.	Eldas-No.	L×W×H mm	32×15×8	for cable fastening
49981	120 009 007	Weight g	1.5	
		Fire load kWh	0.01	of polyamide 6.6, halogen-free
		Packing unit pce.	500	

Shears		Technical data		
No.	Eldas-No.	Weight g	223	For cutting neatly and easily every type of flat cables (max. width 32mm).
49930	983 045 037	Packing unit pce.	1	
				

Insulating tape		Technical data		
No.	Eldas-No.	L×W×H mm×m	50×1	To reinsulate correctly the holes due to pointed screws or cutting teeth when removing or displacing connections.
49632	150 901 147	Weight g	50.1	
		Dielectric strength max. kV/mm	18	
		Temperature max.	+70 °C	
		Packing unit m	1	Weatherproof, self-fusing.

Cable glands		Technical data		
No.	Eldas-No.			of polyamide, grey
48560/03/M20	121 682 607	Diameter of cables mm	8.0-11.0	M20×1.5
48560/05/M20	121 682 617		11.0-15.0	
				delivered with O-ring seal of NBR
		Packing unit pce.	5	halogen-free

Basic standards and concepts

A high protection degree requires the highest demands on the installation material.

The IP rating is used to specify the environmental protection - electrical enclosure - of electrical equipment (electrical devices, lighting or installations).

The degrees of protection are most commonly expressed as „IP“ followed by two characteristic numerals. The letters IP stands for Ingress Protection.

The first numeral indicates the degree of protection against accidental contacts and penetration of solid foreign bodies.
The second numeral indicates the degree of protection against harmful effects of water.

When the degree of protection corresponding to one of the numerals is not stated (be it unnecessary or unknown) it is, replaced by an X.

First characteristic numeral	Protection degree	Symbols	Second characteristic numeral	Protection degree	Symbols
0	non-protected		0	non-protected	
1	Protection against solid bodies exceeding 50mm dia. No protection against deliberate access.		1	Protection against vertically falling drops	
2	Protection against solid bodies exceeding 12.5mm dia. Keep fingers away.		2	Protection against dripping water when tilted up to 15° in relation to its normal position	
3	Protection against solid bodies exceeding 2.5mm dia. Keep away tools and wires.		3	Protection againt water falling at an angle up to 60° in relation to the vertical position	
4	Protection against solid bodies exceeding 1mm dia. Keep away tools and wires.		4	Protection against splashing water	
5	Protection against dust penetration, total protection against any contact		5	Protection against water jets from any direction	
6	Total protection against dust penetration, total protection against any contact		6	Protection against heavy seas or inundations	
			7	Protection against the effects of immersion under defined conditions of pressure and time	
			8	Protection against long submersion