2005

Flexible connectors • Solderless terminals • Contact systems

druseidt Elektrotechnik

Highly flexible air- and watercooled connectors and cables for hi-tech-applications in industrial and high-current equipment.

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druseidt Elektrotechnik

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We make the customers wishes to the focus of our discussion and offer multifarious manufacturing processes

Customers satisfaction, quality, flexibility and a continuously improvement are the essential components of our management policy. They are guidelines and conditions for all our activities and our extensive delivery program. So we are glad to introduce with this catalogue a wide range of flexible components for high current transmission. Our different production processes enable the manufacturing of highly flexible braids, ropes and ready assembled cables as well as welded connectors. All articles are manufactured in coordination with your specified applications. From the smallest ground or earthing tapes up to high current cables with 6000 mm² conductor cross-section – almost all conceivable applications are covered. Whether in air-cooled or water-cooled designs, we can offer you the right components and solutions. More information about our company and our additional product ranges (electrical installation materials and high current contacts and accessories for anodising and electroplating equipment) are contained in our internet homepage under:
www.druseidt.de

The following production processes are at our disposal:

- manufacturing of highly flexible braids, stranded ropes and tubular braids for shielding
- manufacturing of solderless pressed copper- and aluminium-connectors and earthing tapes as well as connectors made out of stainless steel braid
- soldering and welding of flexible connectors
- press-/diffusion welding of copper connectors made out of strips
- inert gas or electron beam welding of high current components
- press-riveting of copper connectors
- extruding of cables with special insulation materials as well as insulated supple bars

All product fields are supported by modern plants for milling, turning, drilling and grinding and by our construction department. As required we offer complete solutions for high current transmission and various kinds of applications.
Please contact us directly for technical support.
With pleasure we'll calculate special offers for your company.

We've established an extensive and certificated Quality-Management-System

Two of the essential components of our company policy are the quality and the customers satisfaction. To meet this requirements constantly, we've established an extensive and certificated information and QM-System.
The existing system and the organizational proceedings will permanently complete and further developed to guarantee the reliability of every ranges of our company durable and economical.

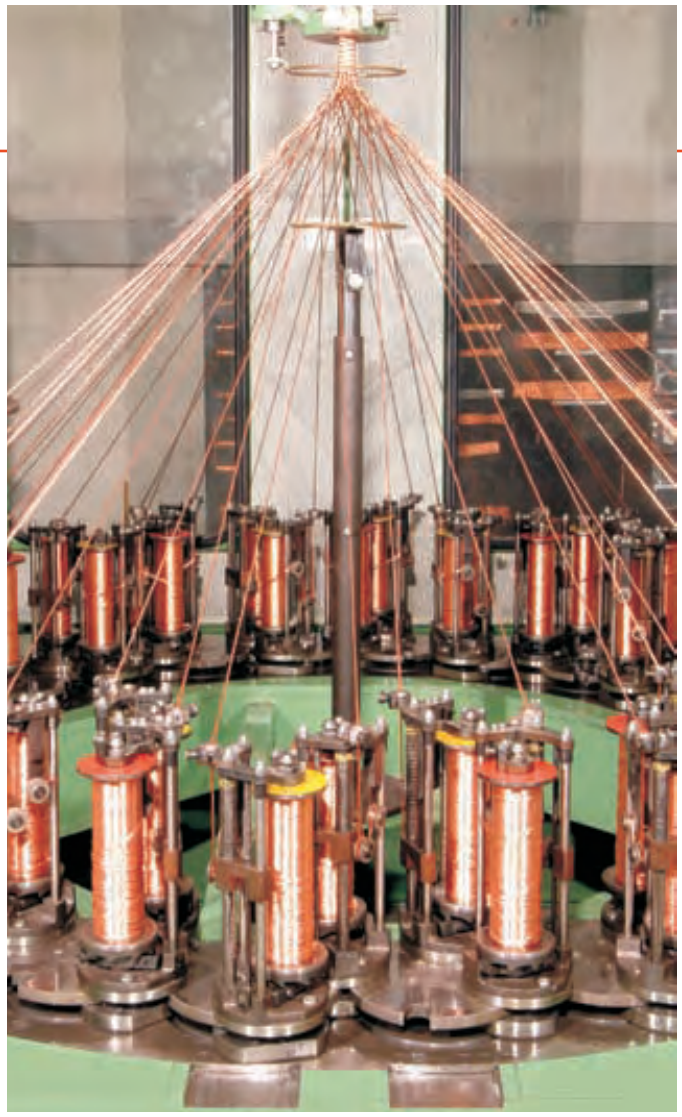
So we work in all of our departments (construction-, production-, sales- and purchasing department etc.) exclusive to arranged and documented procedures.

We offer more than the simply delivering of components for current-transmission or electrical installation material e.g.:

- realization of a high quality standard
- reproduction of products and processes
- quick delivery of products
- flexibility to realize your special wishes
- extensive consultation and service performances
- constructional support by the realization of projects and products
- developing of new and further development of existent products
- extensive communication mediums, e.g. for a transference of drawings by mail directly to our CAD-Systems, a transference of photos/videos by mail, a cooperation via Internet/Internet-shop etc.
- detailed catalogues and product information
- detailed description of our company and products on our website
- detailed examinations and analysis of complaints and errors
- realization of logistic conceptions in cooperation with our customers
- extensive services, realization of repair and installation works, constructional solutions for plants and high current components, express deliveries of stocked standard material etc.

We manufacture flexible components
for current-transfer from the braid
up to a solderless pressed connector

Twisting of conductors and manufacturing of round stranded cables



Weaving and manufacturing of braids

Finished products: Round stranded copper cables, braided copper tapes

Finished products: Solderless pressed connectors

We manufacture
flexible components in welded design
for current-transfer made out of copper-
or aluminium strips

Pictures on the right:
Press-/diffusion welding

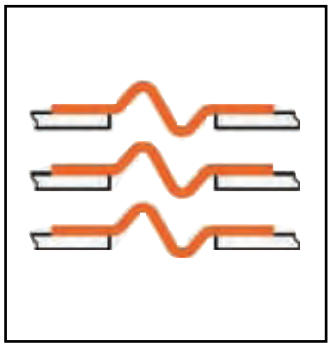
Fusion welding

Finished products: Fusion welded Al- and copper connectors

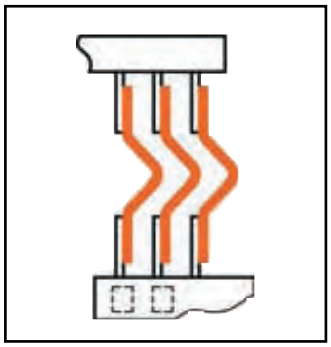
Finished products: Press welded copper connectors

Flexible connectors for multifarious applications

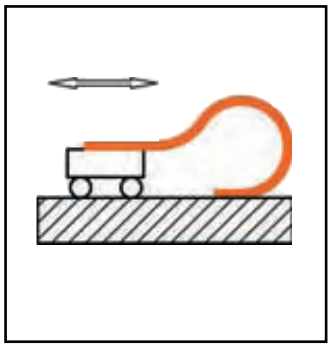
Flexible connectors made out of braids as well as out of strips are used nearly in all kinds of applications for high current transfer. Our very modern machinery equipment combined with a very long experience in constructing and producing braids and high current connectors enables us to manufacture flexible components in every technical possible variation. So they have become particularly well established in following applications:



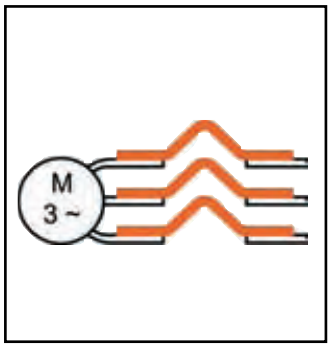
Expansion connectors inside of bus bar-systems



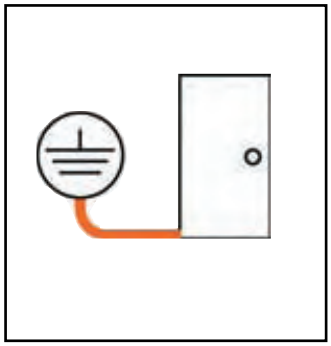
Connections between switchgears, transformers or generators and prefabricated power networks



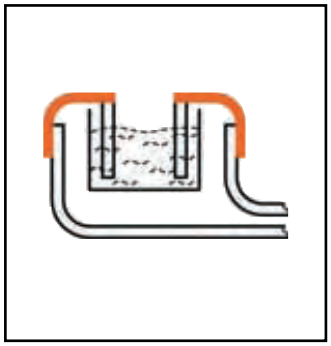
Connections between fixed machine parts and movable switching devices



Connections between motor- and machine parts



Connections as earthing tapes



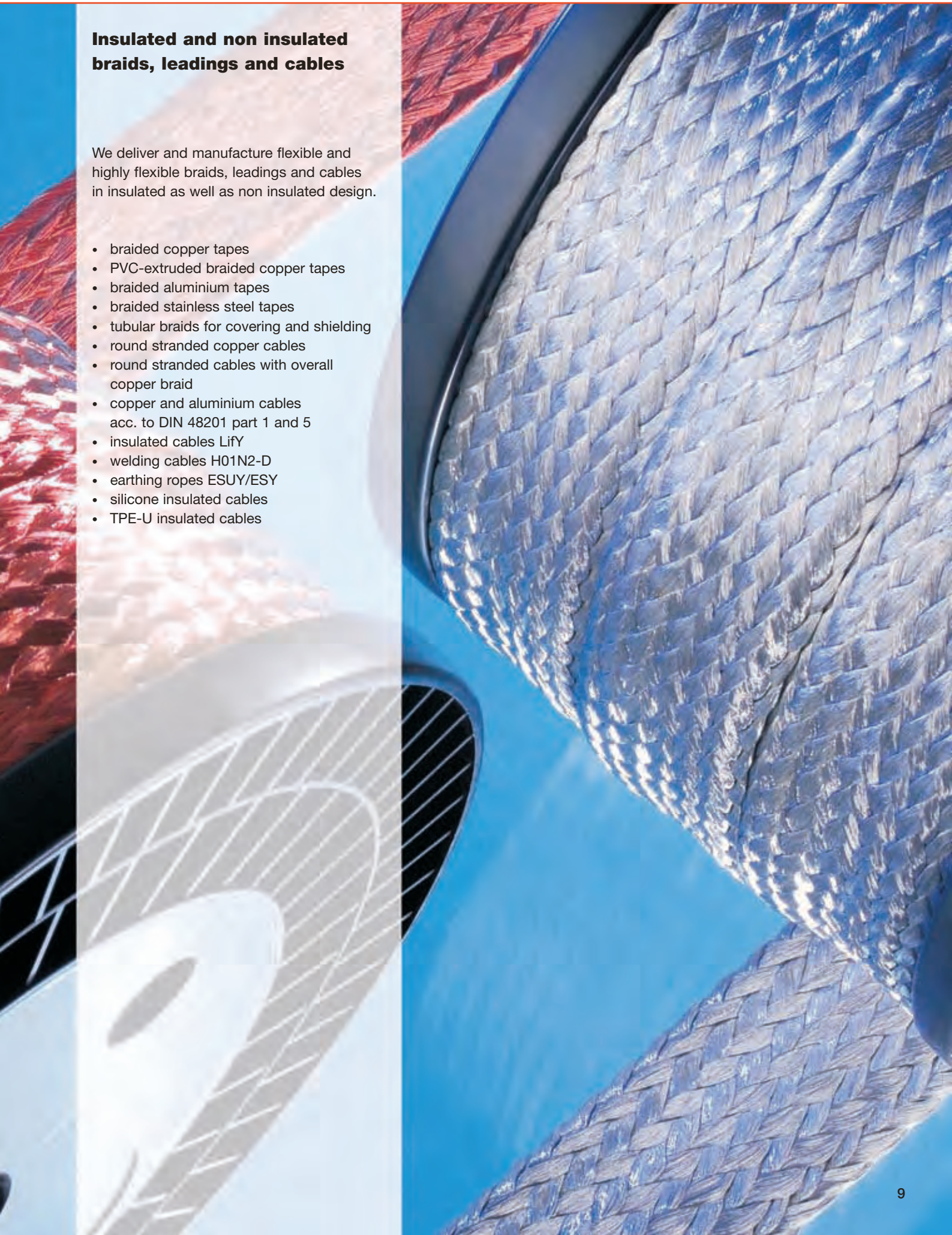
Connections between electrodes and bus bars in electrolyses cells

We deliver and manufacture flexible and highly flexible conductors on rolls or spools as well as ready assembled components in air and water cooled design made out of copper, aluminium or stainless steel wires.

Insulated and non insulated braids, leadings and cables

We deliver and manufacture flexible and highly flexible braids, leadings and cables in insulated as well as non insulated design.

- braided copper tapes
- PVC-extruded braided copper tapes
- braided aluminium tapes
- braided stainless steel tapes
- tubular braids for covering and shielding
- round stranded copper cables
- round stranded cables with overall copper braid
- copper and aluminium cables acc. to DIN 48201 part 1 and 5
- insulated cables LifY
- welding cables H01N2-D
- earthing ropes ESUY/ESY
- silicone insulated cables
- TPE-U insulated cables



Highly flexible braided copper tapes

Construction and application

Our highly flexible braided copper tapes consist of annealed uncoated or tinned Cu-ETP1 wires acc. to DIN EN 13602. They are manufactured as flat rolled tubes. To produce such material we use different production lines of bunchers and braiding machines with a different number of carriers (16/24/36 or 48). The construction of the braids are so selected that a maximum of flexibility and a optimal finishing is guaranteed.

Additionally to our standardized program it is also possible to produce braids in special construction in coordination with your application or according to your wishes. Such braids are mainly used as highly flexible components for earthing or lightning protection as well as industrial current transfer applications.

Technical data

Material

- annealed Cu-ETP1 wires acc. to DIN EN 13602
- wire-Ø 0,05 mm (1 mm²)
- wire-Ø 0,07 mm (1,5-10 mm²)
- wire-Ø 0,10 mm (16-400 mm²)

Surface

- uncoated or tinned

Delivery

- in rings, on spools or wooden drums

Part-No.		technical data				
uncoated	tinned	cross-section mm²	dimensions mm diameter and number of wires	width	thickness	weight kg/% m
02790	**02815**	1	16 x 32 x 0,05	3,2	0,7	1,50
02791	**02816**	1,5	16 x 25 x 0,07	4	1	1,70
02792	**02817**	2	16 x 33 x 0,07	5	0,8	2,20
02793	**02818**	2,5	24 x 27 x 0,07	5,8	1	2,70
02794	**02819**	4	24 x 43 x 0,07	8,2	1	4,25
02795	**02820**	6	24 x 66 x 0,07	10	1	6,00
02796	**02821**	8	24 x 88 x 0,07	12	1,1	8,00
02797	**02822**	10	24 x 109 x 0,07	13,8	1,3	10,00
02799	**02824**	16	24 x 85 x 0,10	18	2	16,00
02801	**02826**	25	24 x 135 x 0,10	20	2,4	25,00
02802	**02827**	35	36 x 124 x 0,10	29	2,2	35,00
02803	**02828**	50	48 x 133 x 0,10	33	2,8	50,00
02804	**02829**	70	48 x 186 x 0,10	38	3	70,00
02812	**02834**	95	48 x 256 x 0,10	45	4,5	95,00
02805	**02830**	120	48 x 320 x 0,10	50	4,5	120,00
02806	**02831**	140	48 x 373 x 0,10	55	5,3	140,00
02807	**02832**	168	48 x 446 x 0,10	70	4,5	168,00
02808	**-**	250	48 x 664 x 0,10	80	7	250,00
02809	**-**	300	48 x 797 x 0,10	90	7	300,00
02810	**-**	400	48 x 1062 x 0,10	100	8,5	400,00

Flexible braided copper tapes acc. to DIN 72333 part 3

Construction and application

Flexible braided copper tapes consist of wires with a stronger wire-Ø of 0,16 resp. 0,20 mm. They can be used for all applications which do not have special demands to the flexibility of the braids. The planed application acc. to DIN 72333 part 3 is as ground braiding tapes for batteries. Therefore please take account of our ready assembled ground braiding and earthing connectors acc. to catalogue page 23.
Bigger conductor cross-sections as in our following table are available on request.

Technical data

Material
- annealed Cu-ETP1 wires acc. to DIN EN 13602
- wire-Ø 0,16 mm or 0,20 mm

Surface
- uncoated or tinned

Delivery
- in rings, on spools or wooden drums

	Part-No.		technical data				
			cross-section	dimensions mm			weight
	uncoated	tinned	mm²	diameter and number of wires	width	thickness	kg/% m
wire-Ø 0,16	**02798**	**02823**	14	24 x 29 x 0,16	18	1,5	14,00
	02600	**02620**	16	24 x 34 x 0,16	20	1,6	16,00
	02800	**02825**	21	24 x 44 x 0,16	22	2	21,00
	02601	**02621**	25	24 x 52 x 0,16	22	2,5	25,00
	02602	**02622**	35	36 x 48 x 0,16	25	3	35,00
	02603	**02623**	50	36 x 69 x 0,16	33	3,2	50,00
	02604	**02624**	70	48 x 72 x 0,16	35	4,5	70,00
wire-Ø 0,20	**02605**	**02625**	14	36 x 13 x 0,20	18	1,5	14,00
	02606	**02626**	16	36 x 15 x 0,20	20	1,6	16,00
	02607	**02627**	21	36 x 19 x 0,20	22	2	21,00
	02608	**02628**	25	36 x 22 x 0,20	22	2,5	25,00
	02609	**02629**	35	36 x 31 x 0,20	25	3	35,00
	02610	**02630**	50	48 x 33 x 0,20	33	3,2	50,00
	02611	**02631**	70	48 x 47 x 0,20	35	4,5	70,00

Highly flexible braided stainless steel tapes

Construction and application

For all applications with special demands to the chemical resistance e.g. in the chemical- and shipbuilding industry, we offer highly flexible stainless steel tapes. Additionally to the selling of the material by the length we manufacture ready assembled components e.g. according to the VG-regulations respectively to our catalogue page 26.

Technical data

Material
- annealed stainless steel wires 1.4401
- wire-Ø 0,10 mm

Surface
- uncoated

Delivery
- in rings or on spools

	Part-No.	technical data				
		cross-section	dimensions mm			weight
		mm²	diameter and number of wires	width	thickness	kg/% m
wire-Ø 0,10	**30031**	3	36 x 10 x 0,10	10	0,5	2,00
	30032	16	36 x 57 x 0,10	20	1,4	13,00
	30033	25	36 x 90 x 0,10	30	1,5	21,00
	30034	35	36 x 124 x 0,10	30	2,0	30,00
	30035	50	48 x 133 x 0,10	35	2,0	42,00

Flexible PVC-extruded braided copper tapes 10-210 mm² insulated by a black high quality vinyl compound

Construction and application

Our flexible PVC-extruded braided copper tapes are made out of annealed uncoated Cu-ETP wires and are insulated by a black high quality vinyl compound. The compound is hardly inflammable/self-extinguishing and free of lead. The electrical conductor is a flexible copper braid manufactured by a flat rolled copper tube. The technical characteristics of the insulation material e.g. the operating voltage up to 1 kV and the heat resistance up to +105° C combined with the flexibility of the braids offer multifarious applications inside switchgears or control panel devices as well as earthing connections. The braids belong to our standard range and are normally in stock for fast delivery, electively in rings or on spools. The described insulation with black colour is standard but on request by ordering an appropriate quantity it is also possible to manufacture a translucent nature coloured PVC-insulation with a heat resistance to appr. +85° C.

Technical data

Electrical conductor

- braided copper tapes made out of Cu-ETP wires
- annealed, uncoated wires
- single wire-Ø 0,15 mm (10/16 mm²) respectively single wire-Ø 0,20 mm (25-210 mm²)

Insulation

- special vinyl compound
- black, free of lead
- self-extinguishing acc. to UL 94 VO
- elasticity 365%
- dielectric strength 20 kV/mm
- operating voltage max. 1 kV
- operating temperature -20° C up to +105° C

Delivery

- in rings or on spools

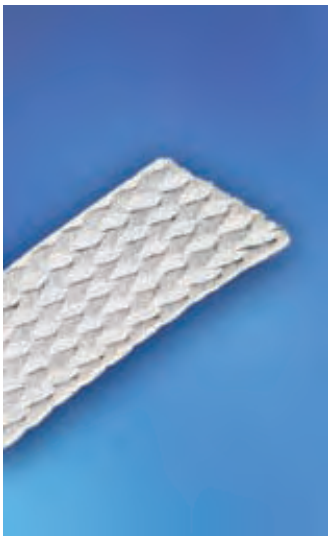
Part-No.	technical data												
	cross-section	ca. dimensions mm braid			with insulation			current load in dependence of the conductor heat in ° Celsius					
	mm²	B	x	S	B	x	S	65°	75°	85°	90°	95°	105°
16280	10	10	x	2	12	x	4	75 A	85 A	100 A	105 A	110 A	120 A
16281	16	16	x	2	18	x	4	100 A	120 A	140 A	150 A	155 A	170 A
16282	25	25	x	2	27	x	4	145 A	175 A	200 A	210 A	220 A	240 A
16283	35	25	x	3	27	x	5	170 A	205 A	235 A	250 A	260 A	285 A
16284	50	25	x	4	27,4	x	6,4	205 A	245 A	280 A	300 A	315 A	340 A
16285	50	30	x	3,3	32,4	x	5,7	215 A	260 A	295 A	310 A	330 A	360 A
16286	70	25	x	5,6	27,4	x	8	245 A	295 A	335 A	355 A	375 A	410 A
16287	70	35	x	4	37,4	x	6,4	270 A	325 A	370 A	390 A	410 A	450 A
16288	100	35	x	5,7	38,2	x	8,9	325 A	390 A	445 A	470 A	495 A	540 A
16289	120	40	x	6	43,2	x	9,2	375 A	445 A	510 A	540 A	565 A	620 A
16290	140	40	x	7	43,6	x	10,6	405 A	480 A	550 A	580 A	610 A	670 A
16291	210	42	x	10	46	x	14	505 A	605 A	690 A	730 A	765 A	835 A

Remark:

All information about current load are approximate values in consideration of the cables heat for single laying of air cooled cables and ambient temperature +35° C.

The temperature of the conductor is in dependent on the installation, the application, the cooling, the ambient temperature etc., so that if necessary reducing factors are to be considered. With pleasure our employees assist your company in finding optimal solutions.

Braided aluminium tapes



Construction and application

For applications which requires the using of flexible aluminium components, we deliver braided aluminium tapes with a wire-Ø of 0,15 mm or 0,30 mm. Additionally to the selling of the material by the length we manufacture ready assembled elements respectively to our catalogue page 24.

Technical data

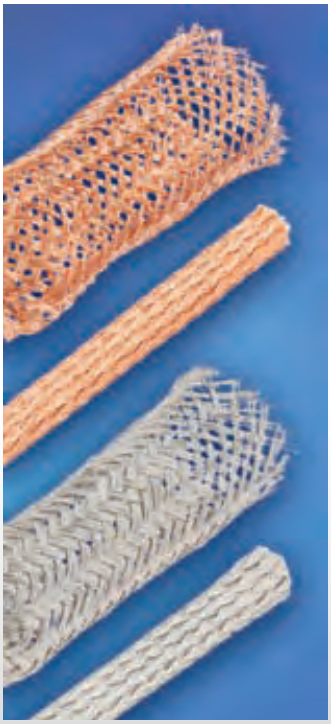
Material
- annealed AL 99,5 wires
- wire-Ø 0,15 mm or 0,30 mm

Surface
- uncoated

Delivery
- in rings or on spools

	Part-No.	technical data			
		cross-section mm²	dimensions mm diameter and number of wires	width	thickness	weight kg/% m
Ø 0,15	**30775**	40	48 x 48 x 0,15	30	2,5	11,50
	30777	55	48 x 64 x 0,15	33	2,5	16,00
wire-Ø 0,30	**30790**	6	24 x 4 x 0,30	9	1	2,00
	30791	10	24 x 6 x 0,30	10	1,5	3,30
	30792	20	36 x 8 x 0,30	20	2	6,70
	30793	25	32 x 12 x 0,30	25	2	8,30
	30794	30	36 x 12 x 0,30	25	2,4	10,00
	30795	40	36 x 16 x 0,30	30	3	13,30
	30796	50	36 x 20 x 0,30	30	3,5	16,70
	30797	80	32 x 35 x 0,30	32	5	26,70
	30798	110	32 x 48 x 0,30	40	5	36,70
	30799	150	32 x 66 x 0,30	40	7	50,00

Tubular braids for covering and shielding



Construction and application

To protect cables and electrical conductors against interferences and to realize a safe data transfer, we deliver our tubular braids for covering and shielding. Different diameters enable an exact coordination with your application. Simply mounting by putting off the braid onto your cable is provided. On request we deliver also special designs in diameters and constructions according to your wishes or in coordination with your application.

Technical data

Material
- annealed Cu-ETP1 wires acc. to DIN EN 13602
- wire-Ø 0,10 mm (0,25-3,10 mm²)
- wire-Ø 0,20 mm (5,30-12,45 mm²)
- wire-Ø 0,30 mm (15,30-51,10 mm²)

Surface
- uncoated or tinned

Delivery
- in rings or on spools

	Part-No.		technical data			
	uncoated	tinned	cross-section mm²	dimensions mm diameter and number of wires	Ø normal/max.	weight kg/% m
wire-Ø 0,10	**15100**	**15120**	0,25	16 x 2 x 0,10	0,7 - 3	0,25
	15101	**15121**	0,38	16 x 3 x 0,10	0,8 - 3	0,36
	15102	**15122**	0,50	16 x 4 x 0,10	1,0 - 4	0,50
	15103	**15123**	0,88	16 x 7 x 0,10	1,5 - 6	0,90
	15104	**15124**	1,32	24 x 7 x 0,10	2,8 - 8	1,22
	15105	**15125**	1,98	36 x 7 x 0,10	4,0 - 12	1,85
	15110	**15126**	3,10	36 x 11 x 0,10	6,0 - 14	2,85
wire-Ø 0,20	**15111**	**15127**	5,30	24 x 7 x 0,20	5,0 - 10	5,30
	15112	**15128**	6,80	24 x 9 x 0,20	6,5 - 14	6,80
	15113	**15129**	7,90	36 x 7 x 0,20	8,5 - 25	7,40
	15114	**15130**	10,20	36 x 9 x 0,20	10,0 - 27	8,70
	15115	**15131**	12,45	36 x 11 x 0,20	12,0 - 29	11,30
Ø 0,30	-	**15133**	15,30	24 x 9 x 0,30	14,0 - 50	16,00
	-	**15135**	35,80	36 x 14 x 0,30	25,0 - 70	36,00
	-	**15137**	51,10	48 x 15 x 0,30	25,0 - 90	51,50

Highly flexible round stranded copper cables similar to DIN 46438

Construction and application

Our round stranded cables consist of annealed wires with a diameter of 0,05/0,07 or 0,10 mm. They are characterized through their high flexibility. By using this material it is possible to manufacture components with bigger cross-sections, but small dimensions. So they offer an installation into difficult equipment as well as into small places. Also the material is well suited for components which have to do movements. Caused by the very small wire diameters the cables have a big surface which is an advantage for the current capacity when working with AC-current or current with higher frequencies. The standard construction for conductor cross-section 1-300 mm² is 6 + 1 = 7 ropes, for conductor cross-section > 300 mm² is 11 + 5 = 16 ropes or 1 + 6 + 12 = 19 ropes. The constructions of the ropes are selected in a manner that a maximum of flexibility and an optimal finishing is guaranteed. On request we deliver also cables in special designs and constructions according to your wishes.

Technical data

Material

- annealed Cu-ETP1 wires acc. to DIN EN 13602
- wire-Ø 0,05 mm (1 mm²)
- wire-Ø 0,07 mm (1,5-16 mm²)
- wire-Ø 0,10 mm (25-1000 mm²)

Surface

- uncoated or tinned

Delivery

- in rings, on spools or wooden drums

	Part-No.		technical data			
			cross-section	dimensions mm		weight
	uncoated	tinned	mm²	diameter and number of wires	outer-Ø	kg/% m
wire-Ø 0,05	**02855**	**02875**	1	512 x 0,05	1,5	1,00
wire-Ø 0,07	**02856**	**02876**	1,5	392 x 0,07	1,9	2,00
	02857	**02877**	2,5	651 x 0,07	2,4	3,00
	02858	**02878**	4	1036 x 0,07	3,1	4,00
	02859	**02879**	6	1561 x 0,07	4	6,00
	02860	**02880**	8	2100 x 0,07	4,2	8,00
	02861	**02881**	10	2604 x 0,07	4,5	10,00
	02862	**02882**	16	4200 x 0,07	5,7	16,00
wire-Ø 0,10	**02863**	**02883**	25	3192 x 0,10	7,5	25,00
	02864	**02884**	35	4480 x 0,10	9	35,00
	02865	**02885**	50	6383 x 0,10	11	50,00
	02866	**02886**	70	8918 x 0,10	13	70,00
	02867	**02887**	95	12100 x 0,10	15	105,00
	02868	**02888**	120	15300 x 0,10	17	132,00
	02869	**02889**	150	19152 x 0,10	19	162,00
	02870	**02890**	185	23580 x 0,10	21	196,00
	02871	**02891**	240	30600 x 0,10	23,5	250,00
	02872	**02892**	300	38200 x 0,10	27,5	315,00
wire-Ø 0,10	**15000**	-	400	50960 x 0,10	33	412,00
	15001	-	500	64288 x 0,10	38	509,00
	15002	-	600	76832 x 0,10	43	600,00
	15003	-	750	95648 x 0,10	46	750,00
	15004	-	850	108976 x 0,10	48	850,00
	15005	-	1000	128576 x 0,10	54	1018,00

Flexible round stranded copper cables

Construction and application

Flexible round stranded copper cables are manufactured out of wires with a diameter of 0,3 mm. They can be used for all applications which do not have special demands to a high flexibility. So they are well suited for longer connections which require certain demands to the mechanical stability.
The constructions are so selected that the cables can be used for different kind of applications. Constructions with a stronger wire-Ø are available on request.

Technical data

Material
- annealed Cu-ETP1 wires acc. to DIN EN 13602
- wire-Ø 0,30 mm

Surface
- uncoated

Delivery
- in rings, on spools or wooden drums

	Part-No.	technical data			
	uncoated	cross-section mm²	dimensions mm diameter and number of wires	outer-Ø	weight kg/% m
wire-Ø 0,30	**15050**	120	1698 x 0,30	15,5	132,00
	15051	150	2166 x 0,30	17,3	162,00
	15052	185	2622 x 0,30	19,0	196,00
	15053	240	3400 x 0,30	22,5	250,00
	15054	300	4275 x 0,30	25,5	315,00
	15055	400	5660 x 0,30	29,0	412,00
	15056	500	7076 x 0,30	33,5	509,00

Round stranded cables with overall copper braids similar to DIN 46440

Construction and application

For applications which require special demands to the mechanical stability, we deliver our round stranded cables with overall copper braids. The overall braids prevent a twisting of the cables and keep it together. So this material is well suited for connections which have to realize movements.
Caused through the overall braids the effective cross-section is higher than the nominal value. On request and by ordering minimum quantities it is possible to deliver tin coated designs.

Technical data

Material
- annealed Cu-ETP1 wires acc. to DIN EN 13602
- wire-Ø round stranded copper cable
  0,05 mm Ø (1-2,5 mm²)
  0,07 mm Ø (4-16 mm²)
  0,10 mm Ø (25-120 mm²)
- wire-Ø overall braids 0,10 mm

Surface
- uncoated

Delivery
- in rings, on spools or wooden drums

	Part-No.	technical data				
	uncoated	cross-section mm²	diameter and number of wires/dimensions mm round stranded cable	copper braid	outer-Ø	weight kg/% m
Ø 0,05	**15060**	1	266 x 0,05	64 x 0,10	1,5	1,00
	15061	1,5	525 x 0,05	64 x 0,10	2	1,60
	15062	2,5	651 x 0,05	64 x 0,10	2,9	2,90
wire-Ø 0,07	**15063**	4	1036 x 0,07	64 x 0,10	3,6	4,60
	15064	6	1575 x 0,07	96 x 0,10	4,5	7,00
	15065	8	2058 x 0,07	96 x 0,10	5	9,40
	15066	10	2562 x 0,07	128 x 0,10	5,5	12,00
	15067	16	4116 x 0,07	192 x 0,10	7	19,50
wire-Ø 0,10	**15068**	25	3234 x 0,10	192 x 0,10	8,9	28,00
	15069	35	4508 x 0,10	240 x 0,10	10,5	41,50
	15070	50	6468 x 0,10	360 x 0,10	12,5	58,50
	15071	70	8967 x 0,10	360 x 0,10	14,7	82,00
	15072	95	12201 x 0,10	360 x 0,10	16,5	109,00
	15073	120	15435 x 0,10	360 x 0,10	19	136,00

Copper and aluminium stranded conductors acc. to DIN 48201 part 1 and 5

Construction and application

Stranded conductors consisting out of copper or aluminium wires with stronger wire-Ø and a corresponding breaking load of the ropes. Applications as electrical conductors inside of energy supply companies. The values of the current capacity are in accordance with DIN 48201. They are approximate values by a frequency up to 60 hertz and a wind velocity of 0,6 m per second and solar influence for an initial atmospheric temperature of +35° C and a maximum cable temperature of +80° C. In special cases where there is a complete lack of wind the figures should be reduced by average of about 30 %.

Technical data

Material copper
- Cu-ETP1 wires acc. to DIN EN 13602
- wire-Ø from 1,35 mm up to 3,25 mm

Surface
- uncoated or tinned

Delivery
- in rings or on wooden drums

Technical data

Material aluminium
- hard aluminium wires
- wire-Ø from 1,7 mm up to 3,74 mm

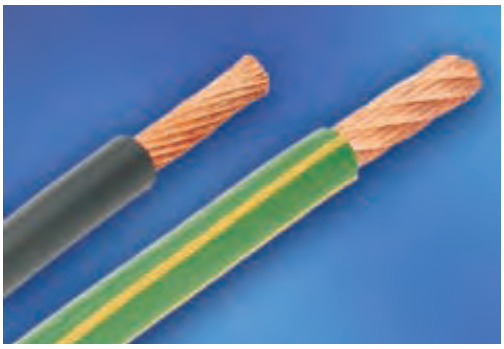
Surface
- uncoated

Delivery
- in rings or on wooden drums

Part-No. material copper			technical data				
uncoated hard	uncoated soft	tinned	cross-section mm²	current-load	dimensions mm diameter and number of wires	outer-Ø	weight kg/% m
60001	**60051**	**60052**	10	90 A	7 x 1,35	4,1	9,00
60003	**60053**	**60054**	16	125 A	7 x 1,70	5,1	14,30
60005	**60055**	**60056**	25	160 A	7 x 2,10	6,3	21,80
60007	**60057**	**60058**	35	200 A	7 x 2,50	7,5	31,00
60009	**60059**	**60060**	50	250 A	7 x 3,00	9,0	44,60
60011	**60061**	**60062**	50	250 A	19 x 1,80	9,0	43,70
60013	**60063**	**60064**	70	310 A	19 x 2,10	10,5	59,60
60015	**60065**	**60066**	95	380 A	19 x 2,50	12,5	84,50
60017	**60067**	**60068**	120	440 A	19 x 2,80	14,0	106,00
60019	**60069**	**60070**	150	510 A	37 x 2,25	15,8	133,70
60021	**60071**	**60072**	185	585 A	37 x 2,50	17,5	164,90
60023	**60073**	**60074**	240	700 A	61 x 2,25	20,3	220,90
60025	**60075**	**60076**	300	800 A	61 x 2,50	22,5	272,50
60027	**60077**	**60078**	400	950 A	61 x 2,89	26,0	364,00
60029	**60079**	**60080**	500	1110 A	61 x 3,23	29,1	454,50

Part-No. AL uncoated	technical data				
	cross-section mm²	current-load	dimensions mm diameter and number of wires	outer-Ø	weight kg/% m
60002	16	110 A	7 x 1,70	5,1	4,30
60004	25	145 A	7 x 2,10	6,3	6,60
60006	35	180 A	7 x 2,50	7,5	9,40
60008	50	225 A	7 x 3,00	9,0	13,50
60010	50	225 A	19 x 1,80	9,0	13,50
60012	70	270 A	19 x 2,10	10,5	18,10
60014	95	340 A	19 x 2,50	12,5	25,60
60016	120	390 A	19 x 2,80	14,0	32,20
60018	150	455 A	37 x 2,25	15,8	40,60
60020	185	520 A	37 x 2,50	17,5	50,00
60022	240	625 A	61 x 2,25	20,3	67,00
60024	300	710 A	61 x 2,50	22,5	82,70
60026	400	855 A	61 x 2,89	26,0	110,40
60028	500	990 A	61 x 3,23	29,1	137,90
60030	625	1140 A	91 x 2,96	32,6	173,20
60032	800	1340 A	91 x 3,35	36,9	221,80
60034	1000	1540 A	91 x 3,74	41,1	276,70

Highly flexible PVC-insulated cables Lify



Construction and application

PVC-insulated cables manufactured out of highly flexible uncoated Cu-ETP1 wires. Well suited as electrical connections inside of switchgears or switchboards as well as inside of vehicles. Additional applications as connecting leads or as earthing connections are available. Standard colours are black or green/yellow. Other colours like red, blue etc. on request.

Remark:
All information about current-load are approximate values acc. to DIN VDE 0298 part 4 table 10 and 11 for single laying of air cooled cables by a ambient temperature +30° C and a allowed conductor heat of +70° C.
By changing the ambient temperature or the kind of laying reducing factors are to be considered.

Technical data

Conductor
- annealed Cu-ETP1 wires acc. to DIN EN 13602
- surface uncoated
- wire-Ø 0,07 mm Ø (0,5-2,5 mm²)
  wire-Ø 0,10 mm Ø (4,0-16 mm²)
  wire-Ø 0,15 mm Ø (25-120 mm²)

Insulation material
- PVC
- colour black or green/yellow
- operating voltage up to 1 kV
- operating temperature
  fixed -20° C up to +70° C
  moved -5° C up to +70° C

	Part-No.		technical data				
	black	green/yellow	cross-section mm²	current-load	dimensions mm diameter and number of wires	outer-Ø	weight kg/% m
Ø 0,07	**15223**	**15255**	0,5	9 A	132 x 0,07	2,2	0,80
	15225	**15256**	0,75	15 A	195 x 0,07	2,5	1,20
	15227	**15257**	1	19 A	260 x 0,07	2,6	1,80
	15229	**15258**	1,5	24 A	392 x 0,07	3,3	2,20
	15230	**15291**	2,5	32 A	691 x 0,07	3,8	3,70
Ø 0,10	**15231**	**15292**	4	42 A	512 x 0,10	4,9	5,60
	15232	**15293**	6	54 A	768 x 0,10	6,2	7,90
	15233	**15294**	10	73 A	1280 x 0,10	7,3	13,40
	15234	**15295**	16	98 A	2048 x 0,10	8,8	20,00
wire-Ø 0,15	**15235**	**15296**	25	129 A	1400 x 0,15	10,5	30,90
	15236	**15297**	35	158 A	1960 x 0,15	12,5	38,00
	15237	**15298**	50	198 A	2800 x 0,15	14,4	53,00
	15238	**15299**	70	245 A	3920 x 0,15	16,2	78,00
	15239	**15370**	95	292 A	5320 x 0,15	19,0	110,00
	15254	**15371**	120	344 A	6720 x 0,15	21,5	138,00

Welding cables H01N2-D

Construction and application

Flexible rubber insulated cables for connecting welding machines with welding guns and similar applications. The stabilized insulation and the flexibility offer multifarious possibilities for electrical connections in different kinds of applications.

Technical data

Conductor
- annealed Cu-ETP1 wires acc. to DIN EN 13602
- surface uncoated
- wire-Ø 0,21 mm (16-95 mm²)
  wire-Ø 0,31 mm (120 mm²)

Insulation material
- Neoprene rubber
- operating voltage max. 100 V
- operating temperature
  fixed -40° C up to +80° C
  moved -25° C up to +80° C
- allowed conductor temperature max. +85° C

Remark:
The fixed values about current load are for welding application acc. to VDE 0298 part 4 table 16 by an ambient temperature +30° C, permanent load (100 %) and allowed conductor heat of +85° C. Values for other current cycles and reducing factors acc. to VDE 0298 part 4.

Part-No.	technical data				
	cross-section mm²	current-load	dimensions mm diameter and number of wires	outer-Ø	weight kg/% m
02899	16	130 A	500 x 0,21	10,5	22,00
02900	25	173 A	760 x 0,21	11,5	31,00
02901	35	216 A	1080 x 0,21	12,0	41,50
02902	50	274 A	1580 x 0,21	15,0	57,00
02903	70	341 A	2160 x 0,21	17,0	79,00
02904	95	413 A	2930 x 0,21	19,0	105,00
02905	120	480 A	1660 x 0,31	23,5	133,00

Insulated earthing ropes ESUY highly flexible, with overall copper braid

Construction and application

Insulated earthing ropes ESUY consist out of a highly flexible stranded copper cable with a additional overall copper braid and are insulated by a transparent PVC-jacket. Caused by the stability of such cables it is often used also in railway equipments. Further standard applications are as earthing connections inside of short circuit devices, heavy current- and energy supply equipments as well as inside of electricity networks. ESUY cables are used to protect working people inside of electrical equipments. According to the VDE regulations the material is manufactured only for earthing applications, therefore no operating voltage is declared.

Technical data

Conductor
- round stranded copper cable with overall copper braid made out of annealed Cu-ETP1 wires acc. to DIN EN 13602
- wire-Ø 0,07 mm resp. 0,10 mm
- surface uncoated

Insulation material
- PVC
- colour transparent
- operating temperature
  fixed -20° C up to +70° C
  moved -5° C up to +70° C

Delivery
- in rings or on spools

Part-No.	technical data			
	cross-section mm²	current-load	diameter and number of wires/dimensions mm round stranded cable copper braid outer-Ø	weight kg/% m
02910	16	4,5 kA	4200 x 0,07 192 x 0,10 9,1	23,00
02911	25	7,0 kA	3192 x 0,10 240 x 0,10 10,4	34,00
02912	35	10,0 kA	4480 x 0,10 240 x 0,10 13,1	48,00
02913	50	14,0 kA	6383 x 0,10 360 x 0,10 14,6	67,00
02914	70	19,5 kA	8918 x 0,10 360 x 0,10 17,4	94,00
02915	95	26,5 kA	12100 x 0,10 360 x 0,10 20,8	127,00

Remark:
The fixed values about current load are by an ambient temperature +20° C and a conductor heat of +250° C. This temperature is allowed for a period of max. 0,5 sec. inside of AC- and three phase current equipments.

Insulated earthing ropes ESY flexible, without overall copper braid

Construction and application

Comparable applications like the ESUY material but manufactured out of wires with a stronger wire-Ø of 0,2 mm and without a additional overall copper braid. Further applications and demands are contained in the regulations of the EN 61230 respectively VDE 0683 part 100.

Technical data

Conductor
- round stranded copper cables made out of annealed CU-ETP1 wires acc. to DIN EN 13602
- wire-Ø 0,2 mm
- surface uncoated

Insulation material
- PVC
- colour transparent
- operating temperature
  fixed -20° C up to +70° C
  moved -5° C up to +70° C

Delivery
- in rings or on spools

Part-No.	technical data			
	cross-section mm²	current-load	dimensions mm diameter and number of wires outer-Ø	weight kg/% m
02920	16	4,5 kA	525 x 0,20 8,4	18,20
02921	25	7,0 kA	800 x 0,20 9,8	26,50
02922	35	10,0 kA	1120 x 0,20 11,4	36,50
02923	50	14,0 kA	1615 x 0,20 13,8	53,70
02924	70	19,5 kA	2250 x 0,20 15,8	74,70
02925	95	26,5 kA	3085 x 0,20 18,2	99,60
02926	120	33,5 kA	3820 x 0,20 20,1	122,00
02927	150	42,0 kA	4800 x 0,20 22,0	152,00

Remark:
The fixed values about current load are by an ambient temperature +20° C and a conductor heat of +250° C. This temperature is allowed for a period of max. 0,5 sec. inside of AC- and three current phase equipments.

TPE-U insulated high current cables 300/500 V resp. 450/750 V

Ready assembled cables manufactured in druseidt press-technology

Construction and application

For high current applications and to connect electrical devices we offer our TPE-U insulated cables for a voltage range 300/500 V or 450/750 V. The electrical conductor consists out of a round stranded copper cable with a wire-Ø of 0,3 mm which is insulated with a special TPE-U compound. The insulating material is free of halogen. It enables a flexible and simple installation also of longer cables distances in a short time. The use of ready assembled cables, manufactured in druseidt crimp-technology, in length and with contact areas in coordination with the application offer a further possibility to reduce the installation time to a minimum. The cables are well suited to connect transformers, generators or rectifiers inside of industrial plants as well as electroplating equipments. Caused by the big conductor cross-sections up to 500 mm² they offer an alternative to busbar systems. Additionally to the cable we offer suitable cable lugs, crimping- and cutting-tools. So it is possible to buy a complete mounting system by our company. Standard colour for the 300/500 V design is orange and for the 450/750 V design green. Other colours like black, red, blue etc. and minimum quantities are available on request.

Technical data

Conductor

- round stranded copper cable made out of annealed Cu-ETP1 wires acc. to DIN EN 13602
- surface uncoated
- wire-Ø 0,3 mm

Insulation material

- TPE-U, free of halogen
- orange colour (300/500 V design) green colour (450/750 V design)
- operating voltage U_0/U
  Part-No. 15202-15214 300/500 V
  Part-No. 15216-15228 450/750 V
- testing voltage
  Part-No. 15202-15214 3,4 kV
  Part-No. 15216-15228 4,0 kV
- operating temperature
  fixed -50° C up to +90° C
  moved -40° C up to +70° C

Delivery

- in rings or on wooden drums

	Part-No.	technical data					
		cross-section mm²	dimensions mm diameter and no. of wires	outer-Ø	insulation thickness ca.	current load dep. to conductor heat 70° C	80° C
300/500 V	**15202**	120	1698 x 0,30	18,7	1,6	380 A	420 A
	15204	150	2166 x 0,30	20,9	1,8	440 A	480 A
	15206	185	2622 x 0,30	23,0	2,0	500 A	550 A
	15208	240	3400 x 0,30	26,5	2,0	590 A	650 A
	15210	300	4275 x 0,30	29,5	2,0	675 A	740 A
	15212	400	5660 x 0,30	33,0	2,0	810 A	890 A
	15214	500	7076 x 0,30	37,5	2,0	925 A	1020 A
450/750 V	**15216**	120	1698 x 0,30	18,9	1,7	380 A	420 A
	15218	150	2166 x 0,30	21,1	1,9	440 A	480 A
	15220	185	2622 x 0,30	23,2	2,1	500 A	550 A
	15222	240	3400 x 0,30	27,5	2,5	590 A	650 A
	15224	300	4275 x 0,30	30,5	2,5	675 A	740 A
	15226	400	5660 x 0,30	34,0	2,5	810 A	890 A
	15228	500	7076 x 0,30	38,5	2,5	925 A	1020 A

Remark:

All information about current load are approximate values in consideration of the cables heat for single laying of air cooled cables and ambient temperature +30° C. The temperature of the conductor is in dependent of the installation, the application, the cooling, the ambient temperature etc., so that if necessary reducing factors are to be considered.

Single insulated silicone copper cables 1,8/3 kV

highly flexible, free of halogen and flame retardant

Construction and application

Highly flexible heat resistant cables with stabilized insulation thickness and a good UV and ozone stability. Excellently suitable for high current connections inside switchgears, switchboards or other electro technical installations.

Because the electro technical industry develops switchgears with great power but smaller and smaller dimensions, extremely flexible high current connectors are needed. Our silicone insulated copper cables offer an excellent possibility for high current connections inside multifarious applications.

The heat resistance combined with the great surface of the conductors caused by the small single wire-Ø of 0,07 or 0,10 mm enable a bigger current load compared with PVC or normal rubber insulated conductors. The stabilized insulation which is free of halogen, flame retardant and self-extinguishing offer also multifarious applications inside of the railway or military field. Additionally applications as earthing tapes, high current conducting wires or as flexible heat resistance cables for hand operated welding devices are imaginable too.

Technical data

Conductor

- round stranded copper cables made out of annealed CU-ETP1 wires acc. to DIN EN 13602
- surface uncoated
- wire-Ø 0,07 mm (4-16 mm^2)
- wire-Ø 0,10 mm (25-150 mm^2)

Insulation material

- silicone rubber circa 60 shore A
- free of halogen, chlorine contend < 4 ppm acc. to VDE 0472 part 813 and 814 as well as IEC 754
- hardly inflammable
- self-extinguishing
- tensile strength before growing old 8,3 MPa
- breaking elasticity 300 %
- testing voltage 10 kV
- dielectric strength 20 kV/mm
- short circuit resistance SiR +350° C acc. to VDE 0298 part 3 and 4
- operating voltage
  4-6 mm^2, U_0/U 1,5/1,5 kV
  10-150 mm^2, U_0/U 1,8/3 kV
- operating temperature
  continuously -50° C up to +180° C
  shortly +250° C up to +300° C
  (by touching with a soldering-iron)

General attributes

- excellent electric-arc and tracking resistance and a good UV and ozone stability

Delivery

- in rings, on spools or wooden drums

	Part-No.	technical data								
			dimensions mm			current-load in dependence of the conductor heat in ° Celsius				
		cross-section mm^2	diameter and number of wires	outer-Ø, ca.	insulation thickness, ca.	45°	80°	**90°**	100°	130°
1,5/1,5 kV	**15014**	4,0	1036 x 0,07	4,8	1,1	30 A	50 A	**55 A**	60 A	70 A
	15016	6,0	1568 x 0,07	5,6	1,1	40 A	65 A	**70 A**	78 A	90 A
1,8/3 kV, single insulated	**15020**	10,0	2562 x 0,07	8,5	2,0	50 A	90 A	**98 A**	107 A	120 A
	15022	16,0	4116 x 0,07	10,0	2,0	70 A	125 A	**132 A**	143 A	160 A
	15024	25,0	3234 x 0,10	12,0	2,3	95 A	160 A	**176 A**	187 A	215 A
	15026	35,0	4508 x 0,10	13,8	2,5	115 A	200 A	**218 A**	230 A	260 A
	15028	50,0	6468 x 0,10	15,5	2,5	145 A	245 A	**276 A**	287 A	325 A
	15030	70,0	8967 x 0,10	18,0	2,5	175 A	305 A	**347 A**	352 A	400 A
	15032	95,0	12201 x 0,10	20,0	2,5	215 A	370 A	**416 A**	425 A	485 A
	15034	120,0	15435 x 0,10	21,5	2,5	245 A	425 A	**488 A**	495 A	560 A
	15036	150,0	19404 x 0,10	23,5	2,5	285 A	490 A	**566 A**	575 A	640 A

Remark:

All information about current load are approximate values in consideration of the cables heat for single laying of air cooled cables and ambient temperature +30° C. The values by a conductor heat of +90° C are in accordance with VDE 0298 part 4 table 15. By changing the ambient temperature or the kind of laying reducing factors are to be considered. Nature colour is standard but on request it is also possible to manufacture cables with colours like black, red, blue, yellow/green etc. or with reduced insulation thickness and other operating voltages. Minimum quantity on request. The outside diameter of our highly flexible copper conductors are manufactured in coordination with cable lugs acc. to DIN 46234/DIN 46341 and druseidt tubular cable lugs for fine stranded cables.

Double insulated copper cables 1,8/3 kV or 3,6/6 kV

highly flexible, free of halogen and flame retardant

Construction and application

Double silicone insulated highly flexible cables for greater demands on mechanical and electrical stress.
The silicone compound and the copper conductors are the same like our single insulated cables. So we are able to offer also double insulated cables with excellent technical characteristics in a extremely flexible design. The outside diameter of the stripped cables are manufactured in coordination with cable lugs acc. to DIN 46234/DIN 46431 and druseidt cable lugs for fine stranded cables. Nature colour is standard. Other colours and minimum quantities are available on request.

Technical data

Conductor

- round stranded copper cables, made out of annealed Cu-ETP1 wires acc. to DIN 13602
- surface uncoated

Insulation material

- free of halogen, chlorine contend < 4 ppm acc. to VDE 0472 part 813 and 814 as well as IEC 754
- hardly inflammable
- self-extinguishing
- testing voltage 10 kV
- dielectric strength 20 kV/mm
- operating voltage
  15170-15192 U_0/U 1,8/3 kV
  15138-15160 U_0/U 3,6/6 kV
- short circuit resistance SiR + 350° C acc. to VDE 0298 part 3 and 4
- operating temperature
  continuously -50° C up to +180° C
  shortly +250° C up to +300° C
  (by touching with a soldering iron)

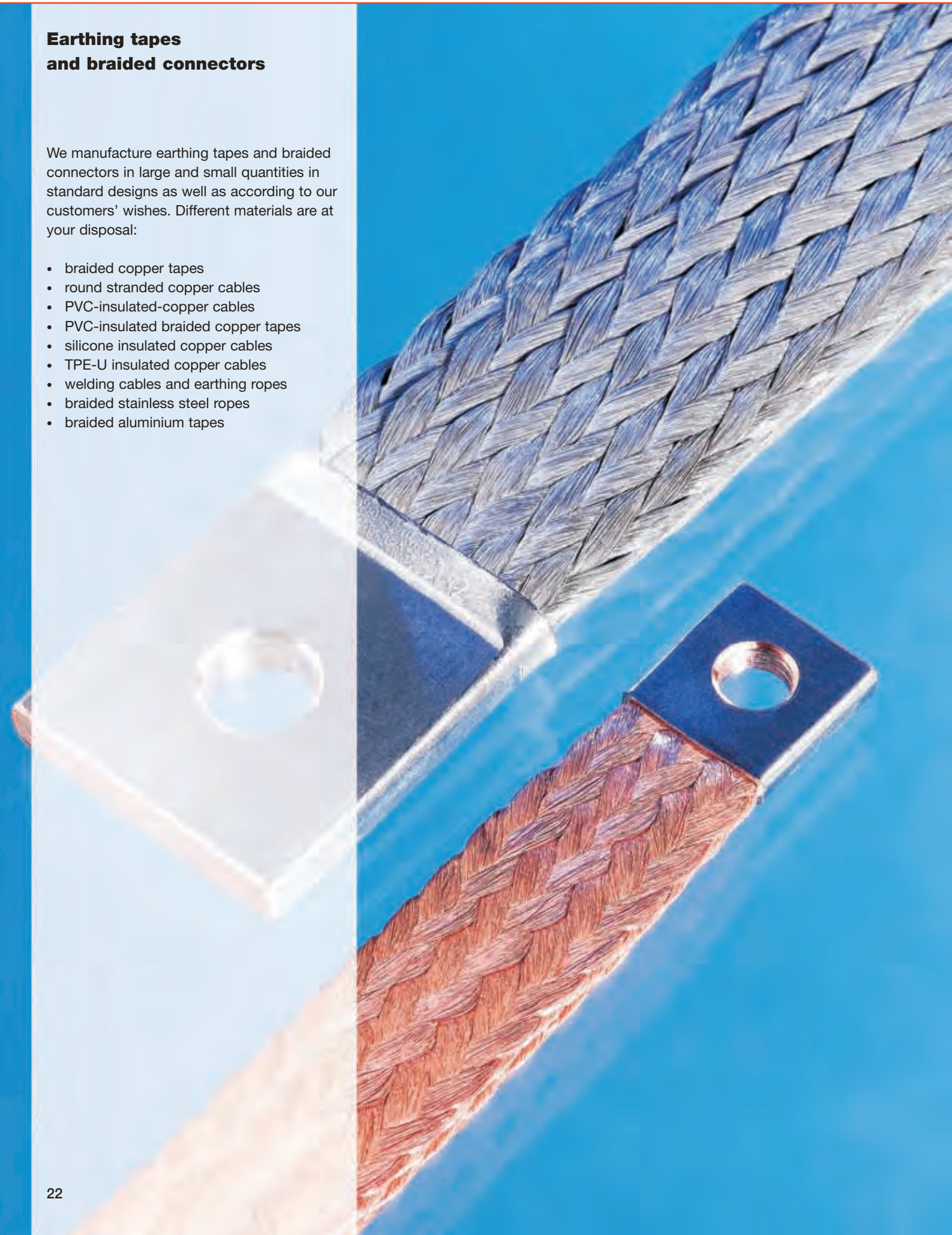
	Part-No.	technical data				
				dimensions mm		
		cross-section mm²	current-load	diameter and number of wires	outer-Ø, ca.	insulation thickness, ca.
1,8/3 kV, double insulated	**15170**	2,5	41 A	651 x 0,07	6,2	1,1 + 1,0
	15172	4,0	55 A	1036 x 0,07	7,0	1,2 + 1,0
	15174	6,0	70 A	1568 x 0,07	8,1	1,2 + 1,2
	15176	10,0	98 A	2562 x 0,07	9,4	1,3 + 1,2
	15178	16,0	132 A	4116 x 0,07	10,7	1,3 + 1,2
	15180	25,0	176 A	3234 x 0,10	12,8	1,6 + 1,2
	15182	35,0	218 A	4508 x 0,10	14,7	1,6 + 1,5
	15184	50,0	276 A	6468 x 0,10	16,7	1,6 + 1,5
	15186	70,0	347 A	8967 x 0,10	19,3	1,6 + 1,8
	15188	95,0	416 A	12201 x 0,10	21,9	1,9 + 1,8
	15190	120,0	488 A	15435 x 0,10	24,4	2,0 + 2,1
	15192	150,0	566 A	19404 x 0,10	26,6	2,1 + 2,1
3,6/6 kV, double insulated	**15138**	2,5	43 A	651x 0,07	8,4	2,0 + 1,2
	15140	4,0	56 A	1036 x 0,07	9,0	2,0 + 1,2
	15142	6,0	71 A	1568 x 0,07	9,7	2,0 + 1,2
	15144	10,0	99 A	2562 x 0,07	11,2	2,2 + 1,2
	15146	16,0	133 A	4116 x 0,07	12,5	2,2 + 1,2
	15148	25,0	174 A	3234 x 0,10	15,2	2,5 + 1,5
	15150	35,0	215 A	4508 x 0,10	16,5	2,5 + 1,5
	15152	50,0	270 A	6468 x 0,10	19,1	2,5 + 1,8
	15154	70,0	338 A	8967 x 0,10	21,1	2,5 + 1,8
	15156	95,0	403 A	12201 x 0,10	24,3	2,8 + 2,1
	15158	120,0	473 A	15435 x 0,10	26,0	2,8 + 2,1
	15160	150,0	546 A	19404 x 0,10	28,4	3,0 + 2,1

Remark:
All information about current-load are approximate values acc. to VDE 0298 part 4 table 15 for single laying of air cooled cables by an ambient temperature +30° C and allowed conductor heat of +90° C.
By changing the ambient temperature or the kind of laying reducing factors are to be considered.

Earthing tapes and braided connectors

We manufacture earthing tapes and braided connectors in large and small quantities in standard designs as well as according to our customers' wishes. Different materials are at your disposal:

- braided copper tapes
- round stranded copper cables
- PVC-insulated-copper cables
- PVC-insulated braided copper tapes
- silicone insulated copper cables
- TPE-U insulated copper cables
- welding cables and earthing ropes
- braided stainless steel ropes
- braided aluminium tapes



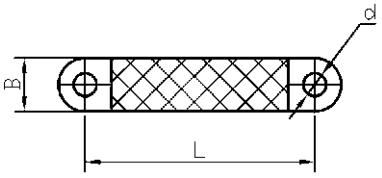
Earthing tapes similar to DIN 72333 Part 3 design A and B

Construction

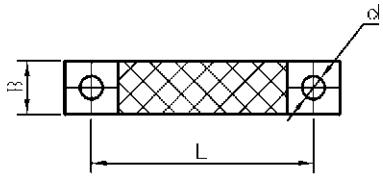
Manufactured out of uncoated as well as out of tinned braid. When placing an order please specify:
- Part-No.
- length
- diameter of the holes
- braid uncoated or tinned

Deliverable designs

design A1 contact areas tinned
design A2 contact areas with brass-tapes and additionally tinned
design B1 contact areas tinned
design B2 contact areas with brass-tapes and additionally tinned



design A1 and A2



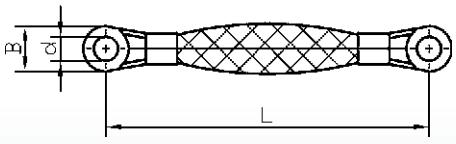
design B1 and B2

	Part-No.		technical data			
			cross-section mm²	dimensions mm B	d	L
design A1 and A2	15280/A1	15280/A2	4	8	according to customers' wishes	according to customers' wishes
	15281/A1	15281/A2	6	10		
	15282/A1	15282/A2	8	12		
	15283/A1	15283/A2	10	14		
	15284/A1	15284/A2	14	18		
	15285/A1	15285/A2	16	20		
	15286/A1	15286/A2	21	22		
	15287/A1	15287/A2	25	22		
	15288/A1	15288/A2	35	25		
	15289/A1	15289/A2	50	33		
	15290/A1	15290/A2	70	35		
design B1 and B2	15280/B1	15280/B2	4	8		
	15281/B1	15281/B2	6	10		
	15282/B1	15282/B2	8	12		
	15283/B1	15283/B2	10	14		
	15284/B1	15284/B2	14	18		
	15285/B1	15285/B2	16	20		
	15286/B1	15286/B2	21	22		
	15287/B1	15287/B2	25	22		
	15288/B1	15288/B2	35	25		
	15289/B1	15289/B2	50	33		
	15290/B1	15290/B2	70	35		

Highly flexible connectors with solderless pressed terminals acc. to DIN 46234

Construction and application

Manufactured out of highly flexible braided copper tapes made out of annealed, tinned Cu-ETP1 wires, with solderless pressed terminals acc. to DIN 46234 at the ends. Everywhere applicable where connections with smaller cross-sections made out of braided copper tapes are needed.



Remark:
Length and drilling are changeable. Connectors with bigger cross-sections on request. When placing an order please specify the wished changes.

Technical data

braid:
- made out of annealed Cu-ETP1 wires
- surface tinned
- wire-Ø 0,07 mm (1,5-10 mm²)
  wire-Ø 0,10 mm (16 mm²)

contact areas
- with solderless pressed terminals acc. to DIN 46234

Part-No.	technical data			
	cross-section mm²	dimensions mm B	d	L
13010	1,5	8	4,3	160
13011	4,0	10	5,3	160
13012	6,0	11	6,5	200
13013	10,0	11	6,5	200
13014	16,0	14	8,5	200

Earthing tapes
with solderless pressed contact areas

Construction and application

Manufactured out of highly flexible braids with solderless pressed contact areas made out of seamless Cu-ETP-tubes. The crimping process is realized without using additives like tin or soldering and welding additives. We use exclusively materials of same analysis and same conductivity of 57 S (braids and tubes). Suitable as earthing tapes as well as components for current transfer. Everywhere applicable where components with high flexibility and an optimized contact resistance are needed.

Technical data

Braids

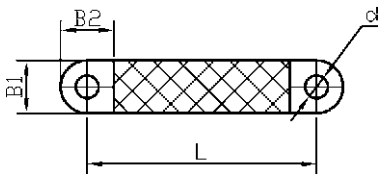
- made out of annealed Cu-ETP wires
- surface uncoated or tinned
- wire-Ø 0,07 mm (10 mm²)
  wire-Ø 0,16 mm (14 mm²)
  wire-Ø 0,10 mm (16-70 mm²)

contact areas

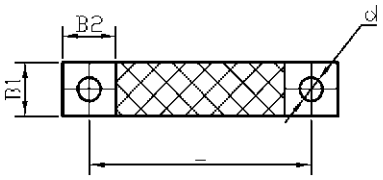
- seamless copper tube made out of Cu-ETP material
- surface uncoated or tinned

Remark:

Manufacturing in large as well as small quantities in length acc. to your wishes. On request also with changed drilling deliverable. When placing an order please specify the wished changes.



design A



design B

	Part-No.		technical data				
			cross-section	dimensions mm			
	uncoated	tinned	mm²	B_1	B_2	d	L
design A	**13015**	**13015 vz**	10	15	15	6,5	according to customers' wishes
	13016	**13016 vz**	14	20	20	9	
	13017	**13017 vz**	16	20	20	9	
	13018	**13018 vz**	25	25	25	9	
	13019	**13019 vz**	35	30	30	9	
	13020	**13020 vz**	50	30	30	9	
	13021	**13021 vz**	70	40	40	11	
design B	**13025**	**13025 vz**	10	15	15	6,5	
	13026	**13026 vz**	14	20	20	9	
	13027	**13027 vz**	16	20	20	9	
	13028	**13028 vz**	25	25	25	9	
	13029	**13029 vz**	35	30	30	9	
	13030	**13030 vz**	50	30	30	9	
	13031	**13031 vz**	70	40	40	11	

Flexible aluminium connectors
manufactured out of braided aluminium tapes

Construction and application

For all applications which requires components consisting out of flexible or highly flexible aluminium material we manufacture ready assembled connectors made out of braided aluminium tapes.
Whether to connect heating elements, aluminium busbars and switchgears or to transfer thermal energy, multifarious applications are conceivable.

To manufacture such components we use our special crimp-technology. So the contact areas are equipped with solderless pressed aluminium tubes or special clamps.
To connect aluminium with copper elements we deliver additional Bi-metallic sheets according to catalogue page 76 with or without drilling, coordinated with your applica-tion.

Flexible insulated earthing tapes and copper connectors 10-210 mm² with solderless pressed contact areas

Construction and application

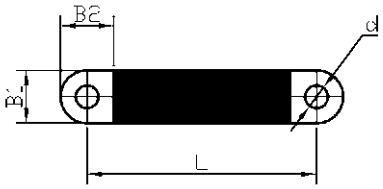
Manufactured by flexible PVC-extruded braided copper tapes with solderless pressed contact areas made out of seamless Cu-ETP-tubes. The crimping process is realized without using additives like tin or soldering and welding additives.
We use exclusively materials of same analysis and same conductivity of 57 S (braids and tubes). So the hereby used druseidt-press technology guarantee a extreme compressing and a optimal contact resistance by compressing the wires so much, that no harmful gases or other environmental influences can go inside. By using our connectors you can be sure to have a very well and optimized contact resistance.
Caused by the technical characteristics of the insulating material and the flexibility of the braids the connectors offer multifarious applications inside switchgears or control panel devices up to app. 730 A as well as earthing connections.

Technical data

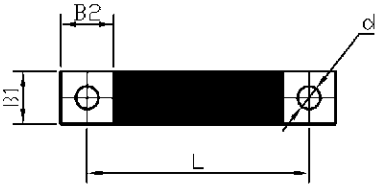
Electrical conductor
- braided copper tapes made out of Cu-ETP-wires
- annealed, uncoated wires
  wire-Ø 0,15 mm (10/16 mm²)
  wire-Ø 0,20 mm (25-210 mm²)

Contact areas
- seamless copper tubes made out of Cu-ETP material
- surface uncoated or tinned

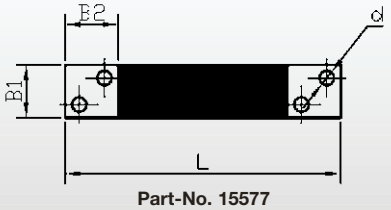
Insulation
- special vinyl compound
- black, free of lead
- self-extinguishing acc. to UL 94 VO
- elasticity 365%
- dielectric strength 20 kV/mm
- operating voltage max. 1 kV
- operating temperature -20° C up to +105° C



design A



design B



Part-No. 15577

Part-No.		technical data						
		cross-section	current-load	dimensions mm				
design A	design B	mm²		B_1	B_2	ca. s	d	L
15415	15560	10	75-105 A	12	12	3,0	5,5	according to customers' wishes
15416	15561	16	100-150 A	15	15	3,3	6,5	
15417	15562	25	145-210 A	20	20	3,8	9	
15418	15563	25	145-210 A	25	25	3,5	9	
15419	15564	35	170-250 A	20	20	4,3	9	
15420	15565	35	170-250 A	25	25	3,6	9	
15421	15566	50	205-300 A	25	25	4,7	9	
15422	15567	50	215-310 A	30	30	4,3	11	
15423	15568	70	245-355 A	25	25	6,0	9	
15424	15569	70	245-355 A	30	30	5,0	11	
15425	15570	70	270-390 A	35	35	5,4	11	
15426	15571	70	270-390 A	40	40	5,2	14	
15427	15572	100	325-470 A	35	35	6,1	11	
15428	15573	100	325-470 A	40	40	7,2	14	
15429	15574	120	375-540 A	40	40	8,0	14	
-	15575	140	405-580 A	40	40	8,6	14	
-	15576	210	505-730 A	40	40	9,8	14	
-	15577	210	505-730 A	50	50	8,0	14	

Remark:

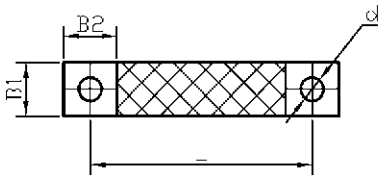
Manufacturing acc. to the customers' wishes in large as well as small quantities.
Uncoated braid and uncoated contact areas are standard. But on request with tinned contact areas and bare braid or with changed drill holes deliverable. By ordering the design with tinned contact areas it is necessary to add the word tinned behind the part-No. (e.g. 15570 tinned). All information about current load are approximate values in consideration of the cables heat for single laying of air cooled cables and ambient temperature +35° C. Minimum value = conductor temperature app. +65° C. Maximum value conductor temperature app. +90° C. The temperature of the conductor is in dependent on the installation, the application, the cooling, the ambient temperature etc., so that if necessary reducing factors are to be considered. With pleasure our employees assist your company in finding optimal solutions.

Highly flexible stainless steel connectors made out of braided stainless steel tapes 1.4401

Construction and application

For all applications with special demands to the chemical resistance e.g. in the chemical- and shipbuilding industry, we offer ready assembled connectors manufactured out of our highly flexible braided stainless steel tapes. To manufacture such connectors we use our druseidt crimp-technology. So the contact areas are equipped with solderless pressed seamless stainless steel tubes.

We manufacture different components in standard design as well as according to customers wishes or according to the VG-regulations (e.g. VG 88711 connectors for earthing applications). So it is possible to change the drilling as well as the length and the dimensions of the contact areas in opposite to our table without problem. When placing an order please be so kind and specify the wished changes.



	Part-No.	technical data				
		cross-section mm²	dimensions mm B_1	B_2	d	L
one layer	**13036**	16	20	20	6,5	according to customers' wishes
	13037	25	30	30	11,0	
	13071	35	30	30	11,0	
	13072	50	35	35	11,0	
	13073	50	40	40	13,0	
two layers	**13074**	32	20	20	6,5	
	13075	50	30	30	11,0	
	13076	70	30	30	11,0	
	13077	100	35	35	11,0	
	13078	100	40	40	13,0	

Flexible stainless steel connectors made out of round stranded stainless steel cables 1.4401

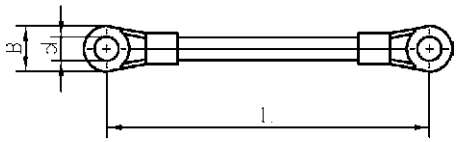
Construction and application

Additionally to our connectors made out of braided tapes we manufacture ready assembled connectors consisting out of round stranded stainless steel cables with a outside diameter from 3 mm up to 16 mm.

The contact areas can be equipped with solderless pressed tubular cable lugs made out of stainless steel in ring- as well as in hook design.

We manufacture such components according to your wishes or according to the regulations of the VG 88711. Additionally to the connectors for earthing applications we deliver connectors with cable lugs or contacts according to your wishes for a large number of different applications.

Flexible connectors 10-300 mm² manufactured by highly flexible round stranded copper cables



Construction

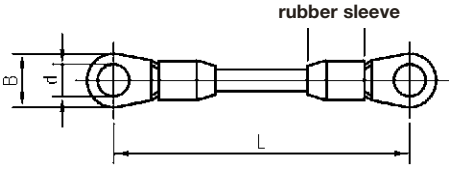
Manufactured by highly flexible uncoated or tinned copper cables with a wire-Ø of 0,07 mm (10-16 mm²) resp. 0,10 mm (25-300 mm²).

design A: with terminals acc. to DIN 46234
design B: with tubular cable lugs

Manufacturing in large as well as small quantities in length acc. to your wishes. On request it is also possible to order an insulated design (e.g. with PVC-, silicone- or shrinking tubes).
With changed drilling on request.
When placing an order please specify the length and the wished changes.

	Part-No.		technical data			
			cross-section	dimensions mm		
	uncoated	tinned	mm²	B	d	L
design A	15240	15240 vz	10	11	6,5	according to customers' wishes
	15241	15241 vz	16	14	8,5	
	15242	15242 vz	25	16	8,5	
	15243	15243 vz	35	16	8,5	
	15244	15244 vz	50	18	10,5	
	15245	15245 vz	70	22	10,5	
	15246	15246 vz	95	24	13	
	15247	15247 vz	120	24	13	
	15248	15248 vz	150	30	13	
	15249	15249 vz	185	36	17	
	15250	15250 vz	240	38	17	
	15251	15251 vz	300	50	21	
design B	15260	15260 vz	10	11	6,5	
	15261	15261 vz	16	15	8,5	
	15262	15262 vz	25	16	8,5	
	15263	15263 vz	35	19	8,5	
	15264	15264 vz	50	22	10,5	
	15265	15265 vz	70	25	10,5	
	15266	15266 vz	95	29	13	
	15267	15267 vz	120	31	13	
	15268	15268 vz	150	36	13	
	15269	15269 vz	185	38	17	
	15270	15270 vz	240	43	17	
	15271	15271 vz	300	49	21	

Highly flexible earthing ropes with green/yellow insulation colour



Construction

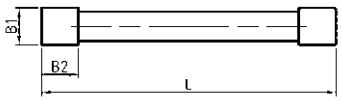
Manufactured by highly flexible uncoated round stranded copper cables with a wire-Ø of 0,07 mm (2,5-16 mm²) resp. 0,10 mm (25-50 mm²) with solderless pressed terminals acc. to DIN 46234 at the ends.
Manufacturing in large as well as small quantities in length acc. to your wishes.
With changed drilling or other cross-sections on request. When placing an order please specify the length and the wished changes.

Part-No.	technical data			
	cross-section	dimensions mm		
	mm²	B	d	L
13000	2,5	10	5,3	acc. to customers' wishes
13001	6	11	6,5	
13002	10	11	6,5	
13003	16	14	8,5	
13004	25	16	8,5	
13005	35	16	8,5	
13006	50	18	10,5	

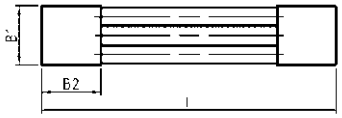
Highly flexible ready assembled copper connectors 50-300 mm²

Solderless pressed design,
extremely movable

one layer



several layers



connectors with drilling on request

Construction and application

Extremely flexible connectors manufactured by one or several single insulated silicone cables in extruded design acc. to the page 20 of this catalogue. The contact areas are assembled with solderless pressed copper connectors.
The connectors with their high flexibility are suitable for connections which have to do movements as well as to transfer high current by using components with smaller dimensions. So they are excellent suitable for connecting components inside switchgears or switchboard applications. The insulating material is free of halogen, flame retardant, self-extinguishing and has a continuous operating temperature up to +180° C.
The technical attributes offer a wide field of applications mainly for installations into difficult equipment or small places.

	Part-No.	technical data					
				dimensions of the contact areas in mm			
		cross-section mm²	current-load	B1	B2	ca. S	L
one layer	**14350**	1 x 50	200 A	20	20	4,7	according to customers' wishes
	14360	1 x 70	250 A	20	20	7,5	
	14370	1 x 95	300 A	25	25	6,7	
	14380	1 x 120	350 A	25	25	7,5	
	14390	1 x 150	400 A	30	30	7,7	
two layers	**14430**	2 x 25	250 A	25	25	4,5	
	14440	2 x 35	300 A	30	30	5,0	
	14450	2 x 50	350 A	30	30	6,0	
	14460	2 x 70	480 A	40	40	6,7	
	14470	2 x 95	560 A	40	40	8,5	
	14480	2 x 120	650 A	40	40	9,1	
	14490	2 x 150	750 A	40	40	11,8	
three layers	**14530**	3 x 25	375 A	40	40	4,4	
	14540	3 x 35	450 A	40	40	6,0	
	14550	3 x 50	525 A	50	50	5,8	
	14560	3 x 70	720 A	50	50	7,8	
four layers	**14630**	4 x 25	500 A	40	40	7,0	
	14640	4 x 35	600 A	50	50	6,5	

Remark:

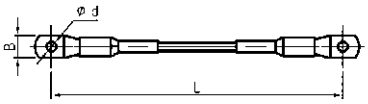
All information about current load are approximate values for single laying and ambient temperature +30° C in acc. with VDE 0298 part 4.
In dependence of the allowed heat of the connectors it is likewise possible to work with higher current rates as recommend (in comparison to the tabular values acc. to page 20).
If you need more information about planned applications don't hesitate to contact our company.

Flexible connectors with cable lugs or plugs and sockets 4-150 mm² respectively 10-120 mm²

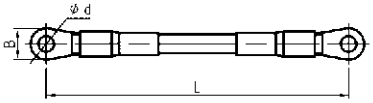
Highly flexible connectors manufactured by single insulated silicone cables acc. to page 20 of this catalogue.

Type A with tubular cable lugs.
Type B with cable lugs acc. to DIN 46234.
The values about the current load are in accordance with VDE 0298 part 4 table 15.

type A with tubular cable lugs



type B with lugs DIN 46234

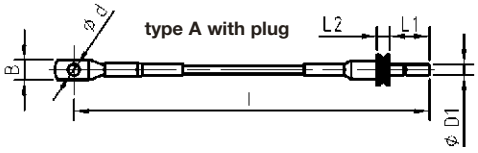


Part-No.		technical data					
				dimensions mm			
type A	type B	cross-section mm²	current-load	d	B type A	B type B	L
16110	**16210**	4,0	55 A	5,3	10,0	10,0	according to customers' wishes
16115	**16215**	6,0	70 A	6,5	11,0	11,0	
16120	**16220**	10,0	98 A	6,5	11,0	11,0	
16125	**16225**	16,0	132 A	8,5	15,0	14,0	
16130	**16230**	25,0	176 A	8,5	16,0	16,0	
16135	**16235**	35,0	218 A	8,5	17,0	16,0	
16140	**16240**	50,0	276 A	10,5	22,0	18,0	
16145	**16245**	70,0	347 A	10,5	25,0	22,0	
16150	**16250**	95,0	416 A	13,0	29,0	24,0	
16155	**16255**	120,0	488 A	13,0	31,0	24,0	
16160	**16260**	150,0	566 A	13,0	35,0	30,0	

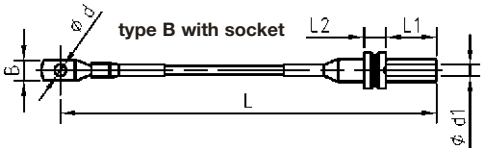
Highly flexible connectors with plugs and sockets manufactured by single insulated extruded silicone cables acc. to page 20 of this catalogue.
Type A one side tubular cable lug and solderless pressed plug at the other side.
Type B one side tubular cable lug and solderless pressed socket at the other side.

Plugs and sockets with snap-in-locking system. They lock automatically when connected. Plugs are inserted only so far that the ring-snaps-in. To release, lightly turn and push in plug, than pull out. We deliver highly flexible connectors in plug technique in various designs.

type A with plug



type B with socket



Part-No.		technical data								
				dimensions mm						
type A	type B	cross-section mm²	current-load	D1/d1	L	L1	L2	d	B
16320	**16325**	10,0	80 A	6,0	according to customers' wishes	22,0	7,0	6,5	11,0
16330	**16335**	16,0	100 A	6,0		22,0	7,0	8,5	15,0
16340	**16345**	25,0	130 A	10,0		42,5	12,0	8,5	16,0
16350	**16355**	35,0	150 A	10,0		42,5	12,0	8,5	17,0
16360	**16365**	50,0	190 A	14,0		43,0	17,0	10,5	22,0
16370	**16375**	70,0	240 A	14,0		43,0	17,0	10,5	25,0
16380	**16385**	95,0	280 A	14,0		43,0	17,0	13,0	29,0
16390	**16395**	120,0	300 A	14,0		43,0	17,0	13,0	31,0

Highly flexible high current copper connectors in solderless pressed design

Construction and application

druseidt high current copper connectors are extremely flexible components and are manufactured out of braided copper tapes with a wire-Ø of 0,07 mm respectively 0,10 mm. Caused by the using of wires with such small diameters and the special conductor construction consisting out of several layers of braids we get elements which have a very large surface. So one of the main characteristics of the druseidt connectors is beside the flexibility the high current capacity of the components. The contact areas are equipped with seamless solderless pressed CU-ETP tubes. Whether made out of braids or round stranded cables, whether in insulated or non insulated design, whether with coated or uncoated surfaces, we are able to manufacture a large number of connectors from 25 mm^2 up to 6000 mm^2 with contact areas from 20 mm up to 200 mm width. We manufacture
large as well as small quantities in length according to your wishes. Ready assembled connectors made out of round stranded copper cables can be delivered with different wire-Ø up to a conductor cross-section of 1000 mm^2.
Our connectors are used nearly in all kinds of application for high current transfer. They have become particularly well established as connectors in switchgears and between transformers, generators, rectifiers, switching devices and prefabricated power networks. They can compensate expansions caused by an increase of temperature as well as movements caused by a vibration of switchgears, transformers or generators.

druseidt press-technology

The druseidt press-technology used for the manufacturing of our connectors guarantees extreme compressing and an optimal contact resistance. As an opposite of the typical method by using terminal lugs this procedure makes a fully pressed braid-integrated contact-area. Through the very high pressure the space which contains air between the wires is so much compressed, that no harmful gases or other environmental influences can go inside. The crimping process is realized without using additives like tin or soldering and welding additives. We use exclusively materials of same analysis and same conductivity of circa 57 S (braids and tubes).

Consultation and construction

Your wishes are the guidelines for all our activities.
So we offer extensive consultations as well as a constructive support through our construction department when planning projects or new products. We realize high current solutions for different kinds of applications in cooperation with our customers.

Connectors in special design

Additionally to our extensive standard program we offer individual constructed components and solutions for solving your problems. Our diverse manufacturing processes facilitate the production of highly flexible braided connectors according to your wishes and your applications.
Following some possibilities for connectors in special design:

- braided connectors with variable contact areas to connect switchgears with smaller connection-bar to busbar systems (e.g.one side contact area width 80 mm and 100 mm at the other side).
- braided connectors with one or more branched off conductors with different contact areas from 20 mm up to 100 mm width suitable for a current capacity between 160 A and 2600 A.
- braided connectors with several contact areas
- braided connectors with special clamps for clamping graphite electrodes or current bars in round shaped design
- braiding connectors consisting out of several round stranded copper cables
- braided connectors with bended contact areas
- braided connectors in shaped design (e.g. 90° or 180°) for welding machines or transformer connections
- braided connectors with special insulation materials and/or with coated contact areas (tin-, nickel-, silver- or gold plated)

Highly flexible high current copper connectors

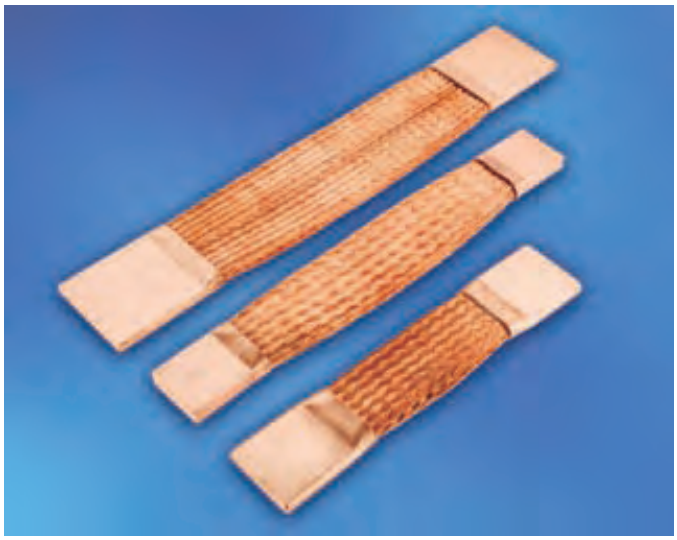
Multifarious solutions for solving your problems:

- extremely flexible components
- made out of braided tapes as well as round stranded cables
- made out of uncoated or tin coated wires

- with or without insulation
- with or without coated contact areas

- with contact area width 20 mm up to 200 mm
- with conductor cross-section 25 mm^2 up to 6000 mm^2

Highly flexible copper connectors in solderless pressed design



braided connectors non insulated

braided connectors with standard PVC-insulation

braided connectors liquid resistance insulated

Standard design

Uncoated E-Copper braid, highly flexible (wire-Ø 0,07/0,10 mm) with solderless pressed contact areas made out of uncoated, seamless E-Copper tubes.

Contact areas

Contact areas rectangular with bending protection (standard). Without or bending protection only on one side on request. It is also possible to change the length of all contact areas. In special design we deliver connectors with contact area width 140/150/160/180 and 200 mm.

Drilling

Standard design without drilling. On request drilling according to druseidt-type I-III or customers' wishes are available.

Insulation

On request deliverable also in insulated design. Standard material is a PVC-tube or materials like silicone, glass-fibre- or shrinking tubes etc. on request.

Liquid resistances

Available with protected insulation against liquids or moisture on request.

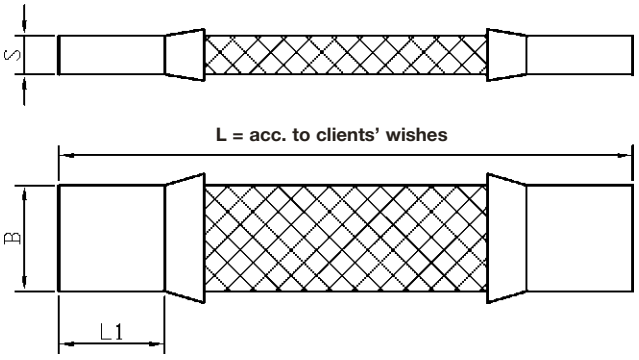
Special designs

In special design we deliver also connectors made out of tinned wires or with coated contact areas (tin-, nickel-, silver- or gold plated) or in coordination with your application according to your drawings/samples or wishes.

When placing an order please specify

- druseidt-Part-No.
- total length
- if drilling is needed either druseidt-design I-III or acc. to your drawings or sketches
- if insulation tubes are needed please add the word insulated behind the part-no. If you need another insulation material like PVC please specify this in your order.
- If you need an additional protection against splash water please add the remark with liquid resistance tube

Highly flexible copper connectors
In solderless pressed design 25-4500 mm²



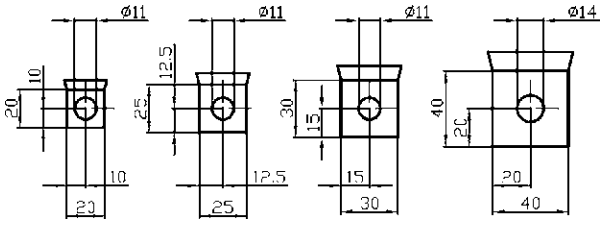
Technical data

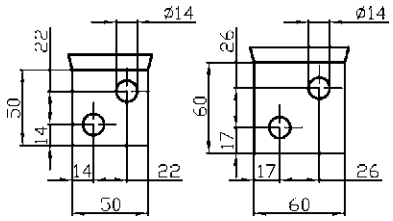
braids
- made out of annealed Cu-ETP wires
- uncoated surface is standard
- tinned surface on request
- wire-Ø 0,10 mm

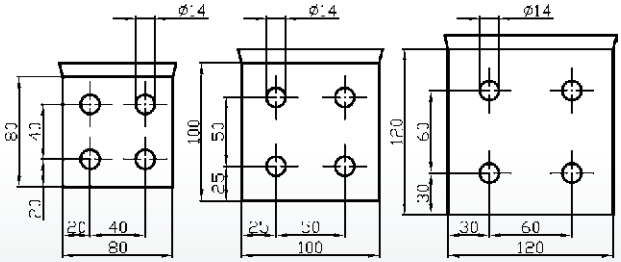
contact areas
- seamless Cu-ETP-tube
- uncoated surface is standard
- tin-, nickel-, silver-coated surface on request

Insulation
- PVC-tube (standard)
- Silicone-, glass-fibre-, shrinking tubes or others on request

	Part-No.	technical data						
		cross-section mm²	dimensions mm B	L_1	ca. s	current-load Ampere DC	AC	standard drillings
type I	02930	25	20	20	3,5	150	140	type I
	02931	50			5	250	240	
	02932	75			7	350	340	
	02933	100			9	400	380	
	02934	25	25	25	3,5	150	140	
	02935	50			4,5	300	280	
	02936	75			6	350	340	
	02937	100			7	450	420	
	02938	125			8,5	500	470	
	02939	50	30	30	4	300	290	
	02940	75			5	400	390	
	02941	100			6	450	440	
	02942	150			8,5	550	540	
	02943	200			11,5	650	640	
	02944	300			15,5	800	790	
	02945	100	40	40	7,5	500	480	
	02946	150			7,5	600	590	
	02947	200			9,5	700	680	
	02948	250			10,5	800	780	
	02949	300			13	900	850	
	02950	400			15,5	1000	980	
type II	02951	140	50	50	6	650	630	type II
	02952	210			8,2	800	780	
	02953	280			10	950	900	
	02954	420			14	1050	1000	
	02955	560			16,2	1350	1200	
	02956	140	60	60	6,5	700	680	
	02957	210			8	900	850	
	02958	350			11,2	1150	1100	
	02959	490			13,1	1350	1300	
	02960	560			15	1400	1350	
type III	02961	340	80	80	9,5	1200	1100	type III
	02962	520			11,5	1500	1400	
	02963	700			14,5	1700	1600	
	02964	840			16	1900	1800	
	02965	1000			19,3	2100	1950	
	02966	500	100	100	11	1600	1500	
	02967	670			12,3	1850	1790	
	02968	860			14,5	2100	2000	
	02969	1000			17,5	2250	2150	
	02970	1200			19	2450	2350	
	02971	1500			23,5	2700	2550	
	02972	610	120	120	11,7	1900	1750	
	02973	1000			16	2650	2500	
	02974	1540			21,2	3400	3200	
	02975	2000			26,2	3950	3800	
	02976	3000			36,2	4800	4550	
	02977	4500			51	5400	5400	





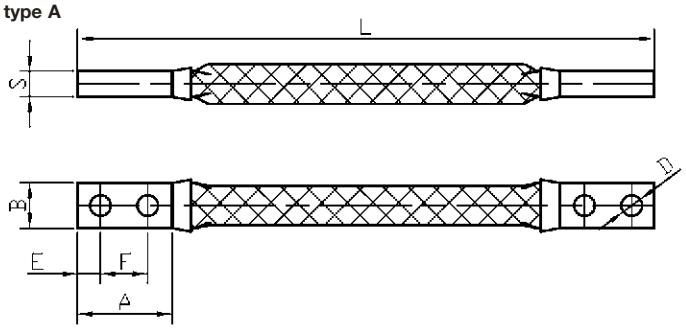


Remark:

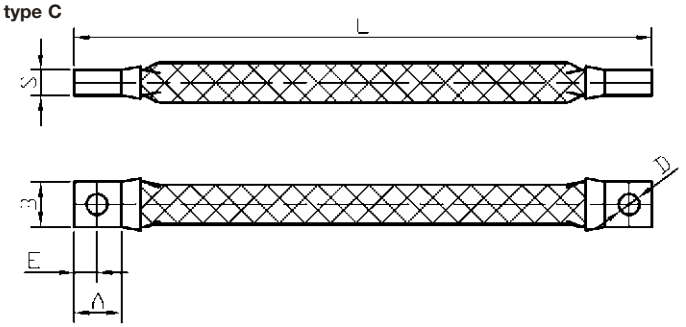
All information about current-load are approximate values for a non insulated design. The reducing factor for an insulated design depending on the application is between 15-20 %. Please notice that the temperature of the conductor is in dependent on the installation, the application, the cooling, the ambient temperature etc. So that if necessary reducing factors are to be considered. With pleasure our employees assist your company in finding optimal solutions.

Air cooled high current cables made out of stranded copper cables with and without insulation, in solderless pressed design

type A



type C



Standard design

Manufactured out of highly flexible round stranded copper cables with wire-Ø 0,10 mm (standard) or 0,30 mm on request. With solderless pressed contact areas made out of uncoated, seamless E-copper tubes.

Contact areas

Contact areas rectangular with bending protection (standard). Without or bending protection only on one side on request. On request it is also possible to change the length of all contact areas.

Drilling

Standard drilling acc. to type A or C or acc. to your wishes.

Length

According to your wishes.

Insulation

Standard insulation material is a PVC-tube. Other materials like silicone, glass-fibre- or shrinking tubes etc. on request. Please notice our design with a special heat resistance fire protection hose on page 36 of this catalogue.

Special designs

In special design we deliver also connectors made out of tinned wires or with coated contact areas (tin-, nickel-, silver- or gold plated) or in coordination with your application according to your drawings, samples or wishes.

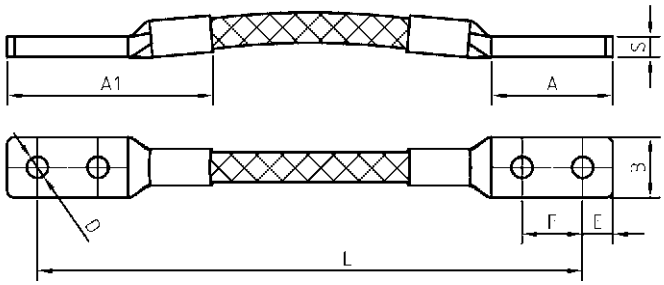
	Part-No.		technical data								
			cross-section		dimensions mm						
	uncoated	PVC-insulated	mm²	current-load	A	B	D	E	F	S	L
type A	**15378**	**15448**	70	300 A	30	15	7	7,5	15	8,5	according to customers' wishes
	15379	**15449**	95	360 A	40	20	9	10	20	8,2	
	15380	**15450**	120	420 A	40	20	9	10	20	10,0	
	15391	**15451**	150	480 A	50	25	11	12,5	25	11,5	
	15381	**15452**	185	570 A	50	25	11	12,5	25	13,5	
	15382	**15453**	240	670 A	60	32	11	16	32	12,8	
	15383	**15454**	300	780 A	80	40	14	20	40	13,3	
	15384	**15455**	400	950 A	80	40	14	20	40	15,5	
	15385	**15456**	500	1100 A	80	40	14	20	40	23,5	
	15386	**15457**	600	1250 A	80	55	14	20	40	18,8	
	15387	**15458**	700	1375 A	80	55	14	20	40	20,2	
	15388	**15459**	750	1450 A	80	55	14	20	40	21,8	
	15389	**15460**	850	1550 A	80	55	14	20	40	22,3	
	15390	**15461**	1000	1800 A	80	55	14	20	40	26,9	
type C	**15398**	**15465**	70	300 A	15	15	7	7,5	-	8,5	
	15399	**15466**	95	360 A	20	20	9	10	-	8,2	
	15400	**15467**	120	420 A	20	20	9	10	-	10,0	
	15411	**15468**	150	480 A	25	25	11	12,5	-	11,5	
	15401	**15469**	185	570 A	25	25	11	12,5	-	13,5	
	15402	**15470**	240	670 A	32	32	11	16	-	12,8	
	15403	**15471**	300	780 A	40	40	14	20	-	13,3	
	15404	**15472**	400	950 A	40	40	14	20	-	15,5	
	15405	**15473**	500	1100 A	40	40	14	20	-	23,5	
	15406	**15474**	600	1250 A	40	55	14	20	-	18,8	
	15407	**15475**	700	1375 A	40	55	14	20	-	20,2	
	15048	**15476**	750	1450 A	40	55	14	20	-	21,8	
	15409	**15477**	850	1550 A	40	55	14	20	-	22,3	
	15410	**15478**	1000	1800 A	40	55	14	20	-	26,9	

Remark:

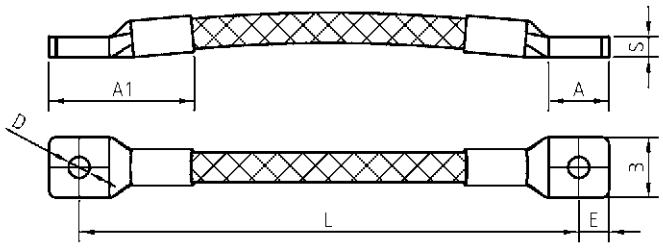
All information about current-load are approximate values for single laying of air cooled cables and ambient temperature +35° C and a conductor temperature of circa +70° C. The temperature of the conductor is in dependent on the installation, the application, the cooling, the ambient temperature etc. so that if necessary reducing factors are to be considered. The reducing factor for an insulated design depending on the application is between 15-20%.

Air cooled high current cables made out of stranded copper cables with and without insulation, in solderless pressed design

type A



type C



Standard design

Manufactured out of highly flexible round stranded copper cables with wire-Ø 0,10 mm (standard) or 0,30 mm on request. With solderless pressed contact areas made out of uncoated, seamless E-copper tubes.

Contact areas

Contact areas shaped like a cable lug, so that it is possible to install also two cables to one connection bar.

Drilling

Standard drilling according to type A or C or according to your wishes.

Length

According to your wishes.

Insulation

Standard insulation material is a PVC-tube.
Other materials like silicone, glass-fibre- or shrinking tubes etc. on request. Please notice our design with a special heat resistance fire protection hose on page 36 of this catalogue.

Special designs

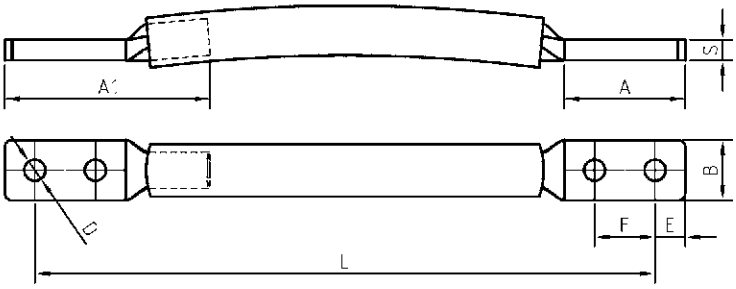
In special design we deliver also connectors made out of tinned wires or with coated contact areas (tin-, nickel-, silver- or gold plated) or in coordination with your application according to your drawings, samples or wishes.

	Part-No.		technical data									
			cross-section		dimensions mm							
	uncoated	PVC-insulated	mm²	current-load	A	A_1	B	D	E	F	S	L
type A	**14645**	**14700**	70	300 A	30	50	15	7	7,5	15	8,5	according to customers' wishes
	14646	**14701**	95	360 A	40	70	20	9	10	20	8,2	
	14647	**14702**	120	420 A	40	70	20	9	10	20	11,0	
	14648	**14703**	150	480 A	50	80	25	11	12,5	25	11,5	
	14649	**14704**	185	570 A	50	80	25	11	12,5	25	13,0	
	14650	**14705**	240	670 A	60	90	32	11	16	32	12,5	
	14651	**14706**	300	780 A	80	135	40	14	20	40	13,5	
	14652	**14707**	400	950 A	80	135	40	14	20	40	15,5	
	14653	**14708**	500	1100 A	80	135	40	14	20	40	22,0	
	14654	**14709**	600	1250 A	80	135	55	14	20	40	17,0	
	14655	**14710**	750	1450 A	80	135	55	14	20	40	21,0	
	14656	**14711**	850	1550 A	80	135	55	14	20	40	22,3	
	14657	**14712**	1000	1800 A	80	135	60	14	20	40	24,5	
type C	**14660**	**14715**	70	300 A	15	35	15	7	7,5	-	8,5	
	14661	**14716**	95	360 A	20	50	20	9	10	-	8,2	
	14662	**14717**	120	420 A	20	50	20	9	10	-	11,0	
	14663	**14718**	150	480 A	25	55	25	11	12,5	-	11,5	
	14664	**14719**	185	570 A	25	55	25	11	12,5	-	13,0	
	14665	**14720**	240	670 A	32	62	32	11	16	-	12,5	
	14666	**14721**	300	780 A	40	95	40	14	20	-	13,5	
	14667	**14722**	400	950 A	40	95	40	14	20	-	15,5	
	14668	**14723**	500	1100 A	40	95	40	14	20	-	22,0	
	14669	**14724**	600	1250 A	40	95	55	14	20	-	17,0	
	14670	**14725**	750	1450 A	40	95	55	14	20	-	21,0	
	14671	**14726**	850	1550 A	40	95	55	14	20	-	22,3	
	14672	**14727**	1000	1800 A	50	105	60	14	20	-	24,5	

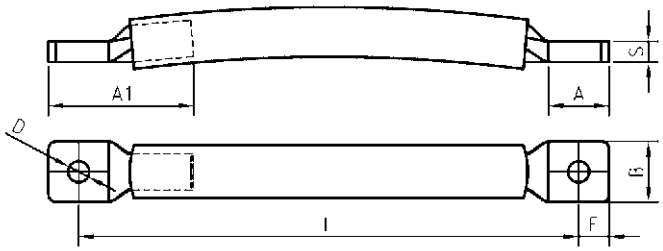
Remark:
All information about current-load are approximate values for single laying of air cooled cables and ambient temperature +35° C and a conductor temperature of circa +70° C. The temperature of the conductor is in dependent on the installation, the application, the cooling, the ambient temperature etc. so that if necessary reducing factors are to be considered. The reducing factor for an insulated design depending on the application is between 15-20%.

High current cables with fire protection hose

type A



type C



Applications

Everywhere, where flexible high current connections with a extremely heat resistance insulation material are needed. E.g. inside of the steel-, foundry-, glass-melting- or non ferrous industry as well as inside of the chemical- or ship-building industry.

Standard design

Manufactured out of highly flexible round stranded copper cables with wire-Ø 0,10 mm (standard) or 0,30 mm on request. With solderless pressed contact areas made out of uncoated, seamless E-copper tubes.

Contact areas

Contact areas shaped like a cable lug, so that it is possible to install also two cables to one connection bar.

Drilling

Standard drilling acc. to type A or C or acc. to your wishes.

Length

According to your wishes.

Insulation

Special fire protection hose. Protection against high temperatures, open flames and metal splash. With inner hose made out of calcium-silicate-yarns and outer silicone cover.

Inner sleeve

Non inflammable, temperature resistance >+700° C.

Silicone cover

Hardly inflammable, self extinguishing, temp. resistance continuously up to +300° C, shortly up to circa +500° C.

Special designs

In special design we deliver also connectors made out of tinned wires or with coated contact areas (tin-, nickel-, silver- or gold plated) or in coordination with your application according to your drawings, samples or wishes.

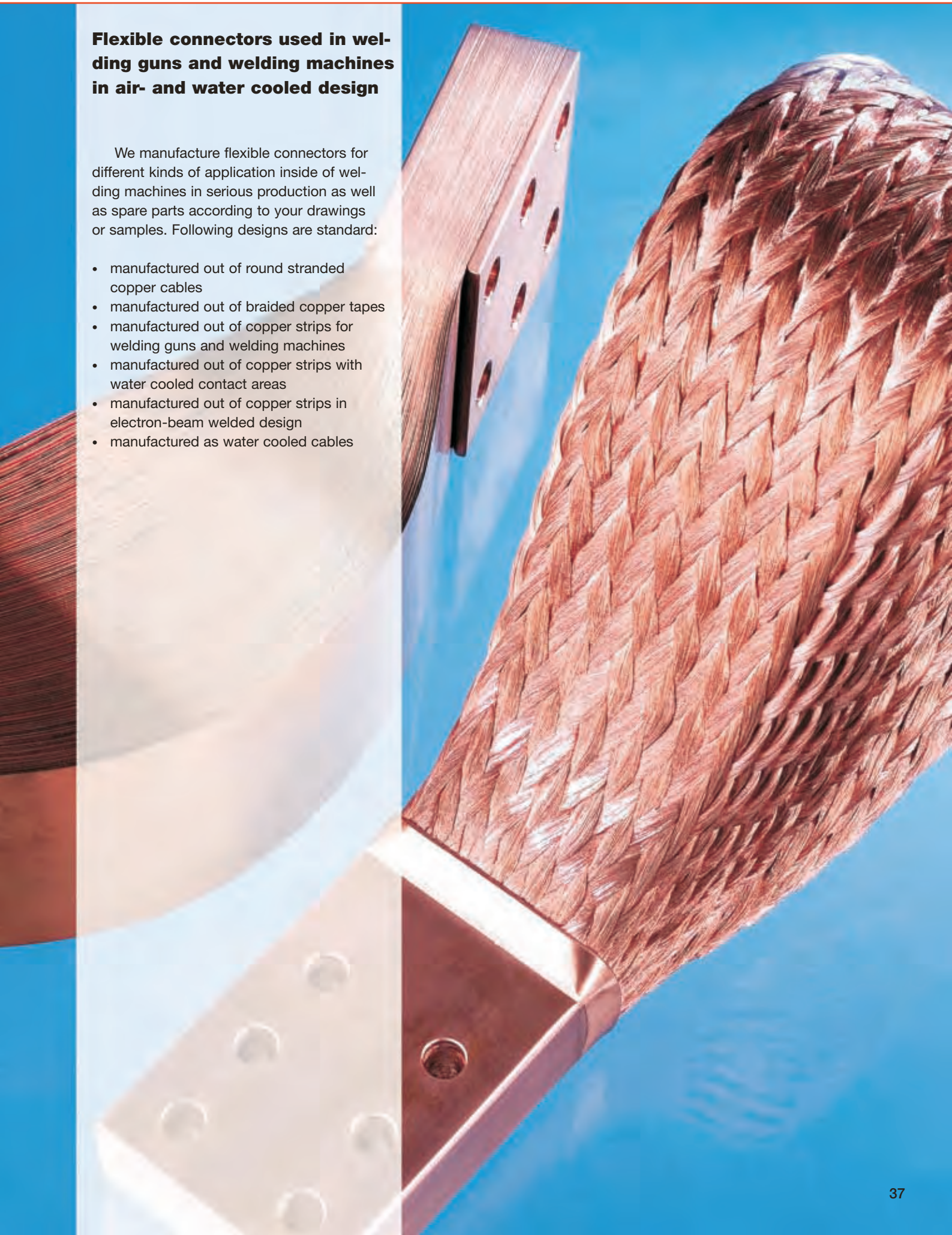
	Part-No.	technical data									
		cross-section mm²	current-load	dimensions mm							
				A	A_1	B	D	E	F	S	L
type A	**15338**	70	250 A	30	50	15	7	7,5	15	8,5	according to customers' wishes
	15339	95	300 A	40	70	20	9	10	20	8,2	
	15340	120	350 A	40	70	20	9	10	20	11,0	
	15341	150	400 A	50	80	25	11	12,5	25	11,5	
	15342	185	475 A	50	80	25	11	12,5	25	13,0	
	15343	240	570 A	60	90	32	11	16	32	12,5	
	15344	300	650 A	80	135	40	14	20	40	13,5	
	15345	400	800 A	80	135	40	14	20	40	15,5	
	15346	500	925 A	80	135	40	14	20	40	22,0	
	15347	600	1050 A	80	135	55	14	20	40	17,0	
	15348	750	1225 A	80	135	55	14	20	40	21,0	
type C	**15358**	70	250 A	15	35	15	7	7,5	40	8,5	
	15359	95	300 A	20	50	20	9	10	40	8,2	
	15360	120	350 A	20	50	20	9	10	-	11,0	
	15361	150	400 A	25	55	25	11	12,5	-	11,5	
	15362	185	475 A	25	55	25	11	12,5	-	13,0	
	15363	240	570 A	32	62	32	11	16	-	12,5	
	15364	300	650 A	40	95	40	14	20	-	13,5	
	15365	400	800 A	40	95	40	14	20	-	15,5	
	15366	500	925 A	40	95	40	14	20	-	22,0	
	15367	600	1050 A	40	95	55	14	20	-	17,0	
	15368	750	1225 A	40	95	55	14	20	-	21,0	

Remark:
All information about current-load are approximate values for single laying of air cooled cables and ambient temperature +35° C and a conductor temperature of circa +70° C. The temperature of the conductor is in dependant on the installation, the application, the cooling, the ambient temperature etc. so that if necessary reducing factors are to be considered. With pleasure our employees assist your company in finding optimal solutions.

Flexible connectors used in welding guns and welding machines in air- and water cooled design

We manufacture flexible connectors for different kinds of application inside of welding machines in serious production as well as spare parts according to your drawings or samples. Following designs are standard:

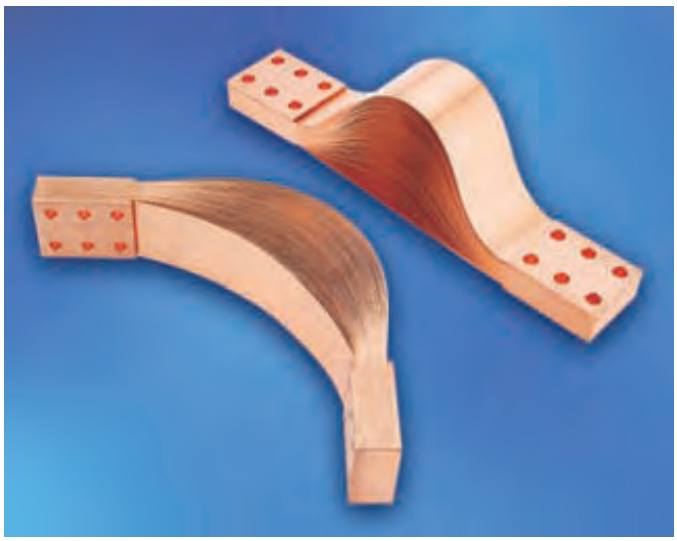
- manufactured out of round stranded copper cables
- manufactured out of braided copper tapes
- manufactured out of copper strips for welding guns and welding machines
- manufactured out of copper strips with water cooled contact areas
- manufactured out of copper strips in electron-beam welded design
- manufactured as water cooled cables



Flexible laminated connectors used in welding guns manufactured out of copper strips

To realize two-dimensional movements inside of welding guns our flexible laminated copper connectors are needed. In standard design they are manufactured out of E-Cu/Cu-ETP strips with a thickness of 0,10 mm or 0,20 mm.
A special press-riveting procedure enables an optimal connection of the strips. The contact areas are additionally equipped with copper sheets or caps. To guarantee durability and functioning it is necessary to use copper material with the right and optimal strength in coordination with the application. Only connectors with the right dimensions manufactured out of the right material enable an optimal lifetime.
For special applications we deliver also electron-beam welded components. By using this special welding process the connection of the copper material can be realized without worth mentioning thermal restriction. So it is possible to preserve the needed elasticity of the laminated connectors.
When designing new products or if problems must be solved, don't hesitate to contact us. With pleasure we offer our "know how" and support your efforts.

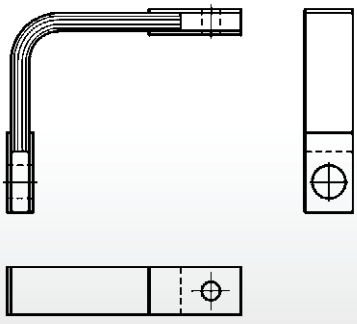
Flexible laminated connectors used in welding machines manufactured out of copper strips



Additionally to our connectors for welding guns, we manufacture also a wide range of flexible elements used in welding machines. So we offer designs from the little laminated connector, similar to the welding gun designs, up to conductor cross-sections of 2000 mm^2 or more, with contact areas up to 200 mm width. Just as much we are specialized of the manufacturing of flexible as well as solid copper components for electrical heating equipments. Everywhere where flexible components for current transfer in conjunction with a realization of movements are needed we are the right partner.
Whether riveted or welded, whether with air- or water cooled contact areas, we deliver the right components coordinated with your applications. Also solid copper components according to your drawings or wishes, manufactured of CNC-machines, are part of our product range. We deliver spare parts as well as components in serious production or complete machine equipments.

Necessary order information

Identical with the information on the opposite page.

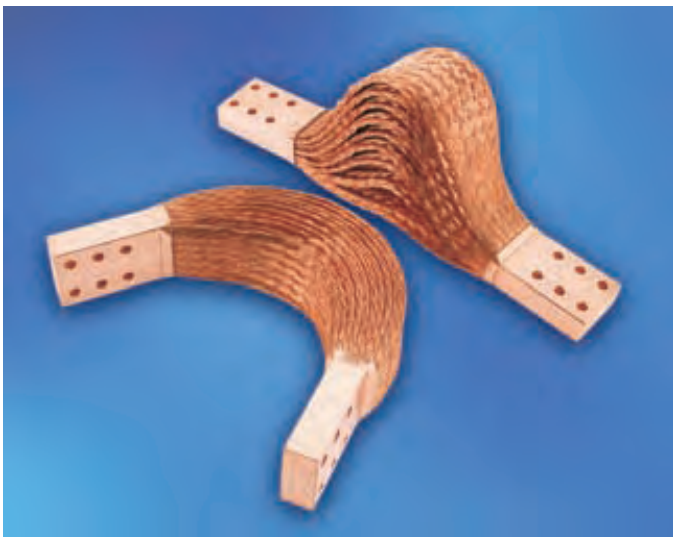


Flexible braided connectors used in welding guns manufactured out of highly flexible braided copper tapes

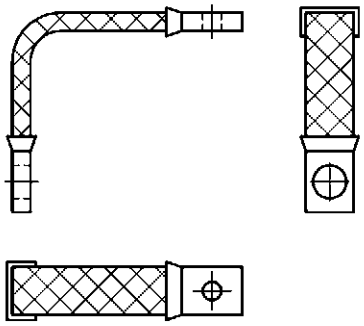
To realize three-dimensional movements inside of welding guns extremely flexible connectors are needed. For such applications we manufacture our braided connectors consisting out of several layers braided copper tapes with a wire-Ø of 0,10 mm. The contact areas are equipped with solderless pressed seamless copper tubes with an additional bending protection. We use our flexible braided copper tapes as basic-material. The construction of the braids is selected in this way, that a maximum of flexibility and an optimal lifetime is guaranteed. We deliver the connectors according to your drawings, samples or wishes with a contact area width from 30 mm up to 50 mm. Following braids are mostly used:
- braided tapes 35 mm^2 - braided tapes 50 mm^2
- braided tapes 70 mm^2 - braided tapes 120 mm^2

The number of the layers depends on the different applications.

Flexible braided connectors used in welding machines manufactured out of highly flexible braided copper tapes



Also for applications in the field of welding machines we deliver flexible braided high current connectors to realize movements in two as well as three dimensions.
They consist out of several layers braided copper tapes, similar to the welding gun designs, but with a contact area width up to 120 mm or greater and conductor cross-sections up to 4000 mm^2.
We use also special braided copper tapes as basic-material. As required we deliver insulated designs with or without punched insulation tubes. If you have to solve current transfer problems don't hesitate to contact us. With pleasure we support your activities.



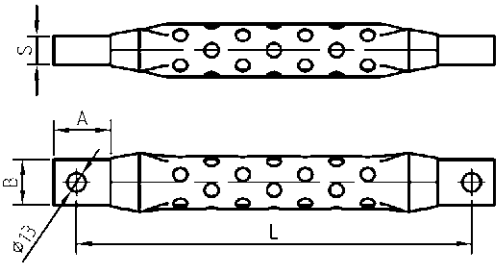
To manufacture these flexible connectors we need the following information:

- conductor cross-section
- dimensions acc. drawing on page 82
- installation situation (e.g. bended 90° or 180°)
- drilling

Please be so kind and write the needed information into our drawing on catalogue page 82 and fax it to our company. If you need more information don't hesitate to contact us.

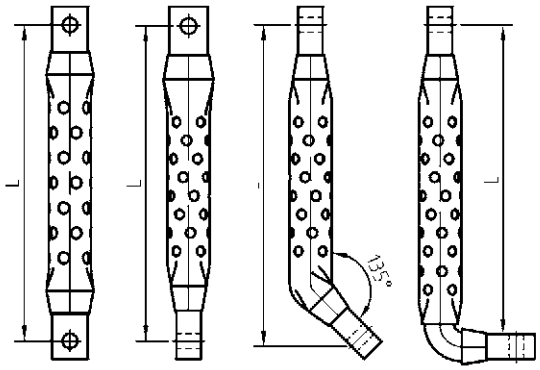
Air cooled round stranded cables for welding machines

Insulated or non insulated highly flexible cables manufactured out of uncoated round stranded copper cables with a wire-Ø of 0,10 mm. All contact areas are equipped with seamless solderless pressed E-copper tubes. For a better thermal removal our standard insulation consists out of a flexible punched insulation tube. The special construction of the conductor ropes combined with the bending protection of the contact areas offer a good lifetime of the cables.
We deliver the cables in different designs according to the following figures.



Part-No.		technical data					
non-insulated	insulated	cross-section mm²	dimensions mm A	B	S	L	
15330	**15350**	200	40	32	11,8	according to customers' wishes	
15331	**15351**	250	40	32	13,0		
15332	**15352**	300	40	32	15,0		
15333	**15353**	400	40	32	20,3		
15334	**15354**	500	40	32	23,0		
15335	**15355**	600	40	38	25,0		
15336	**15356**	750	40	38	37,0		
15337	**15357**	850	40	38	32,0		

Designs



design A **design B** **design F** **design J**

When placing an order please specify:

- Druseidt part-no.
- Design A/B/F or J
- Length (dimension L)

length	current load I_{2P} in Ampere by cross-section mm² 200	250	315	400	500	630	800
160	2500	2800	3150	3550	4000	-	-
200	2240	2500	2800	3150	3550	-	-
250	2000	2240	2500	2800	3150	3550	4000
315	1800	2000	2240	2500	2800	3150	3550
355	1700	1900	2120	2360	2650	3000	3350
400	1600	1800	2000	2240	2500	2800	3150
450	1500	1700	1900	2120	2360	2650	3000
500	1400	1600	1800	2000	2240	2500	2800
560	-	-	-	1900	2120	2360	2650
630	-	-	-	1800	2000	2240	2500

Current load calculation
according to DIN EN ISO 5828

Allowable current-load

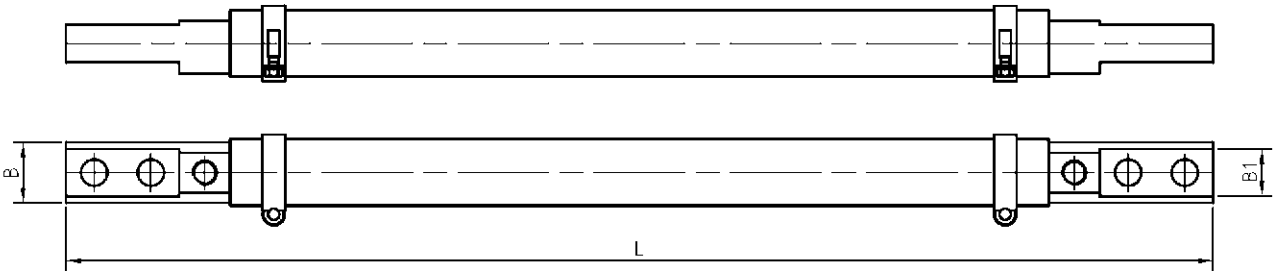
$$I_X = I_{2P} \sqrt{\frac{100}{X}}$$

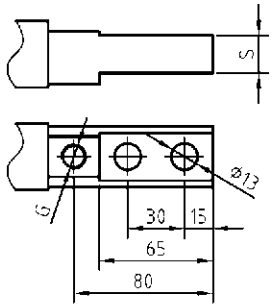
x = duty-cycle

The values based on a rise in temperature of 60° C and contact areas fixed on water cooled busbars.

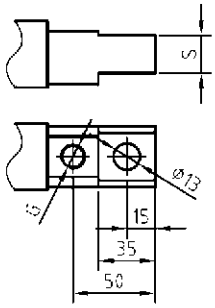
Water cooled cables used in welding machines

Our water cooled cables for applications inside of welding machines or welding devices are available in different designs. Type B is equipped with contact ends according to our druseidt specification and the types C and D are in accordance with DIN EN ISO 8205-2. The connection between the contact ends and the conductor rope is realized by a solderless crimp-process, so that an optimized current transfer is guaranteed. The construction of the conductor ropes as well as the high quality water hoses offer an excellent flexibility and mechanical stability. The cables can be used also for welding roboter applications. The wall thickness (circa 4,5 mm) of our standardized hoses is acc. to the description on page 51. For special applications, requiring a very high flexibility, we offer tubes with a reduced wall thickness. Additionally to our standardized designs we deliver cables according to your drawings/samples or wishes up to a cross-section of 1000 mm².

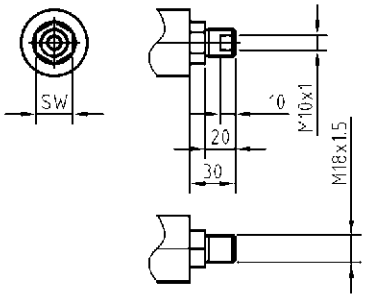




contact area design 1



contact area design 2



contact area design 3

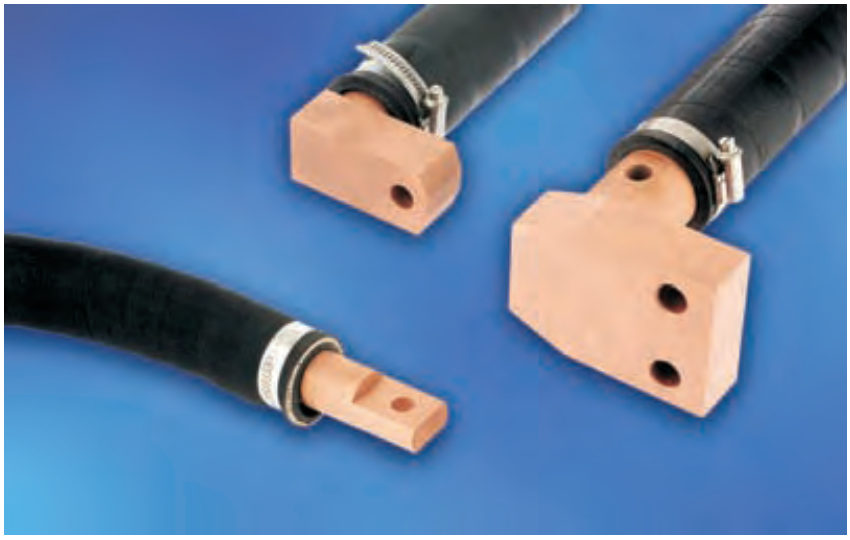
	Part-No.	technical data						
		cross-section mm²	dimensions mm B	B_1	S	G	SW	L
type B	**30638 B**	120	25	21	13	1/4 "	-	according to customers' wishes
	30640 B	150	28	24	15	1/4 "	-	
	30641 B	185	28	23	16	1/4 "	-	
	30644 B	240	32	26	18	1/4 "	-	
	30645 B	300	32	26	18	1/4 "	-	
	30646 B	400	38	32	21	1/4 "	-	
	30647 B	500	42	34	24	1/4 "	-	
type C	**30638 C**	120	25	21	13	1/4 "	-	
	30640 C	150	28	24	15	1/4 "	-	
	30641 C	185	28	23	16	1/4 "	-	
	30644 C	240	32	26	18	1/4 "	-	
	30645 C	300	32	26	18	1/4 "	-	
	30646 C	400	38	32	21	1/4 "	-	
	30647 C	500	42	34	24	1/4 "	-	
type D	**30638 D**	120	25	21	13	1/4 "	21	
	30640 D	150	28	24	15	1/4 "	24	
	30641 D	185	28	23	16	1/4 "	24	
	30644 D	240	32	26	18	1/4 "	24	
	30645 D	300	32	26	18	1/4 "	27	

Deliverable standard designs:

Type B = contact areas on both sides design 1
Type C = contact areas on both sides design 2
Type D = contact areas one side design 2 and design 3 at the other side
Other variations are available on request.

Remark:
Information about current-capacities for welding applications is contained in the DIN EN ISO 8205-2.
Information for current capacities for other applications is available on request.
operating pressure: max. 6 bar
testing pressure: 10 bar

Water cooled cables according to customers' wishes



We produce water cooled cables for various kinds of applications and with contact ends matched to the customers' wishes. All designs with high quality non conducting coolant water hoses.
A fast repair of all common types of cables in a short time also belongs to our service and delivery program.

Water cooled high current cables

Suitable for high current transmission within melting and heating plants, e.g. in

- electric arc- and ladle furnaces as well as in induction-, reduction-, vacuum- or graphitizing furnaces
- inside of the steel-, foundry-, glass melting- or non ferrous metal industry

We produce water cooled cables with conductor cross-sections up to 6000 mm^2 matched to their respective application, e.g. as

- single or multiple conductor cables
- hollow core cables
- with pipe connections
- high power cables with or without rotating joints for electric arc furnaces

A fast repair of all common types of cables in a short time also belongs to our service and delivery program.

Water cooled high current cables with solderless pressed cable heads preferably for mains frequency

water cooled cables in standard design

solderless pressed cable head

Construction and application

Single conductor cables manufactured in the cross-section ranges up to 1000 mm^2 and up 1200 mm^2 as multiple conductor cables. Ideally suited for mains frequency applications, e.g. in production plants in the steel-, foundry-, non-ferrous metal- or glass melting industries, but applications are also feasible in graphitizing furnaces. Our cables are used wherever high currents are transmitted with relocatable loads or in adverse deployment conditions in heating operations. As a result of the construction selected for the inside conductor, combined with the special coolant water hoses and our manufacturing technology, we offer extremely flexible space-saving components for high current transmission.

Connectors and cooling

All standard connectors/cable heads are manufactured out of E-copper material and are crimped on the E-copper conductor without soldering. Using our druseidt crimping technology, only materials of the same conductance value are connected together, without the use of additional materials, such as solder or welding additives. This ensures the best possible loss-free current transmission. The geometry and positioning of crimping facilitates the best possible coolant water flow.

Coolant water connection holes / hose nipples

Thread holes of a sufficient size are made in the connectors to hold hose nipples. The cable is delivered without nipples as standard. These can be additionally ordered as accessories according to our catalogue page 50. It is also possible to set the cooling holes to other positions than the standard or to change the thread size.

Coolant water hoses

The flexible coolant water hoses we use are fitted with additional heat protection against radiated heat and liquid metal splashing. The hose casing is flame retardant and self-extinguishing. The breakdown rating is 6 kV/mm.
The maximum allowed operating pressure for the cables is 6 bar. All cables are tested with a pressure of 10 bar before leaving our factory.

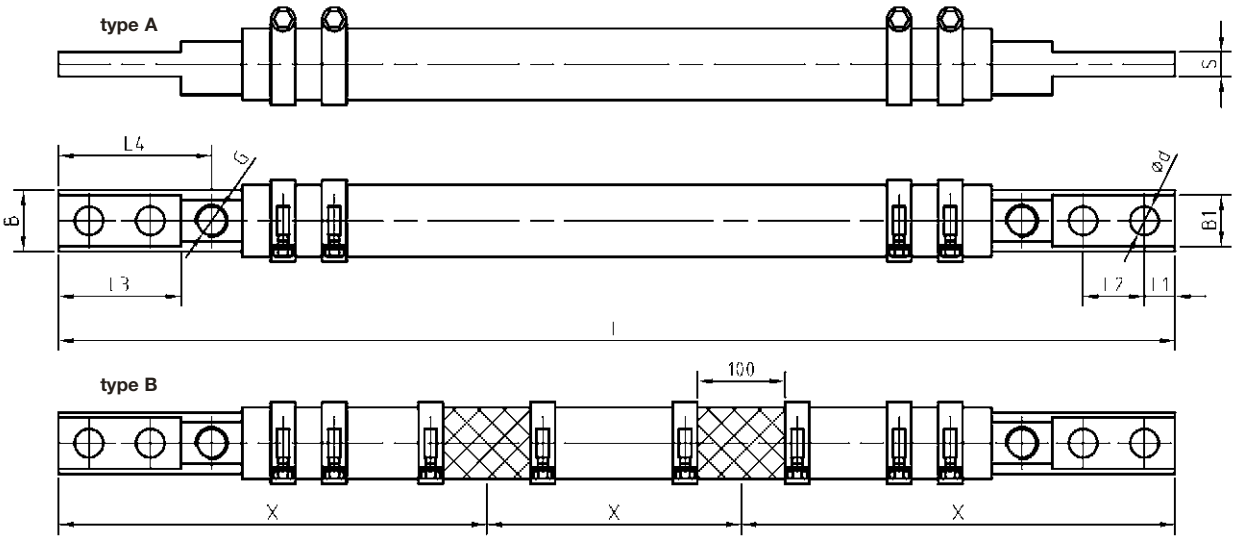
Cable with additional shims

To ensure secure fixture, especially in the case of long water cooled high-current cables, all single conductor cables can be fitted with one or more shims. These additional solid parts fitted in the conductor guarantee easy fitting at the labelled points by means of clamping or holding devices. Squeezing the hose together and the ensuing damage, as well as the reduction in water flow throughput, are thereby avoided.

Special designs and cable repairs

In addition to our standard designs, we also manufacture all cable cross-sections with connectors, as well as offering customised designs (e.g. replacement parts for all common electro-furnaces from the well-known manufacturers).
We also undertake cable repairs at short notice, both for our cables and those of other manufacturers.

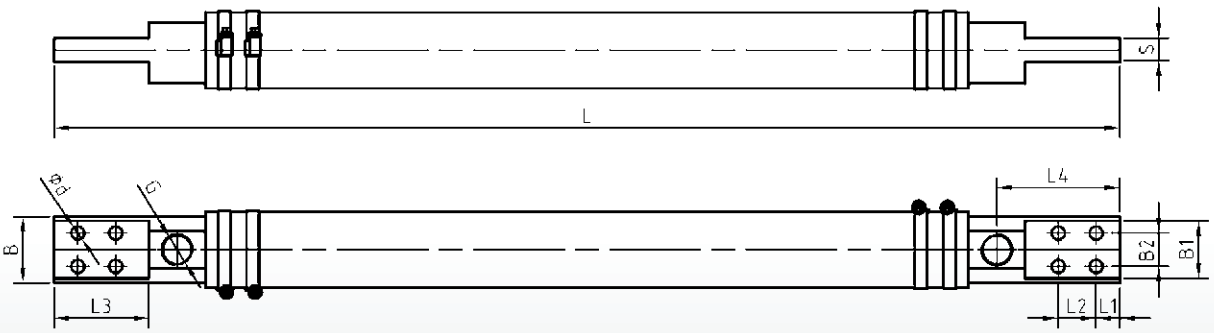
Water cooled high current cables 120-1000 mm²
with heat resistant hoses and solderless pressed cable heads
preferably for mains frequency



Remark:
Type B fitted with one or more shims, to secure fixture, especially when working with long cables.
When placing an order please specify the number and the position of the shims.

Part-No.		technical data											
		cross-section		dimensions mm									
type A	type B	mm²	current-load	L_1	L_2	L_3	L_4	B	B_1	d	G	S	L
30600 A	**30600 B**	120	1600 A	12,5	25	50	60	25	23	11	1/4 ”	10	according to customers' wishes
30601 A	**30601 B**	185	2500 A	15	30	60	75	30	28	14	3/8 ”	12	
30602 A	**30602 B**	300	3700 A	15	30	60	75	35	32	14	3/8 ”	15	
30603 A	**30603 B**	400	4500 A	20	40	80	95	42	37	18	3/8 ”	20	
30604 A	**30604 B**	500	5500 A	20	40	80	95	55	51	18	3/8 ”	20	
30605 A	**30605 B**	750	7500 A	20	40	80	95	55	49	18	3/8 ”	25	
30606 A	**30606 B**	1000	10000 A	25	50	100	120	70	63	22	1/2 ”	30	

Water cooled high current cables 750-2000 mm²
with heat resistant hoses and solderless pressed cable heads
preferably for mains frequency



Part-No.	technical data												
	cross-section		dimensions mm										
	mm²	current-load	L_1	L_2	L_3	L_4	B	B_1	B_2	d	G	S	L
30615	750	7500 A	20	40	85	105	65	61	30	14	3/4 ”	22	acc.to customers' wishes
30616	1000	10000 A	25	40	100	130	70	65	35	14	1 ”	25	
30617	1200	12000 A	30	50	120	150	80	74	40	14	1 ”	30	
30618	1600	16000 A	30	50	120	150	90	83	40	14	1 ”	35	
30619	2000	20000 A	35	60	140	170	100	94	40	14	1 ”	35	

Water cooled hollow core cables with soldered cable heads preferably for medium frequency up to 10 kHz

Hollow core cables in standard design

Soldered cable head with conductors wound around a spring core

Construction and application

The used conductor ropes, with their large surfaces, and the construction of our water cooled hollow core cables offer an optimized water flow and therefore an excellent cooling of the cables. Caused by their constructive characteristics they are well suited for high current transmission in the field of medium or higher frequencies. Two series are standard. For applications up to 2000 hertz with uncoated or on request also tinned standard ropes and for applications up to 10000 hertz with stranded special ropes made out of individual enamelled wires. All conductors with bigger cross-sections are wounded around a non magnetic spring core. This construction allows water to flow also through the centre of the cable and enable so an optimized cooling. Such cables are mainly used in the field of induction plants or induction furnaces.

Connectors and cooling

All standard connectors/cable heads are manufactured out of E-copper material and are connected with the conductor ropes by soldering. Caused by the constructive characteristics hollow core cables offer a better cooling and water flow compared with single conductor cables.

Coolant water connection holes / hose nipples

Thread holes of a sufficient size are made in the connectors to hold hose nipples. The cable is delivered without nipples as standard. These can be additionally ordered as accessories according to our catalogue page 50. It is also possible to set the cooling holes to other positions than the standard or to change the thread size.

Coolant water hoses

The flexible coolant water hoses we use are fitted with additional heat protection against radiated heat and liquid metal splashing. The hose casing is flame retardant and self-extinguishing. The breakdown rating is 6 kV/mm. **The maximum allowed operating pressure for the cables is 6 bar.** All cables are tested with a pressure of 10 bar before leaving our factory.

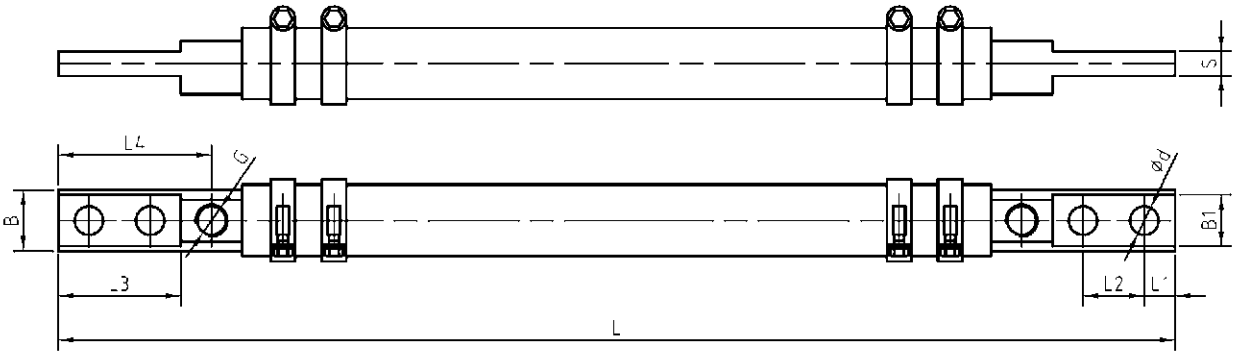
Hollow core cables for pipe connections

To connect water cooled cables with pipe systems of power leading tubes or with tubing connectors of contact plates cables with special power leading connectors are needed. We deliver such cables equipped with connectors on one or both sides for standard applications with frequencies up to 2000 hertz and for tube diameters up to 70 mm. Material of the standard connectors is brass. Other materials on request.

Special designs and cable repairs

In addition to our standard designs, we also manufacture all cable cross-sections with connectors, as well as offering customised designs (e.g. replacement parts for all common electro-furnaces from the well-known manufacturers).
We also undertake cable repairs at short notice, both for our cables and those of other manufacturers.

Water cooled hollow core cables with heat resistant hoses



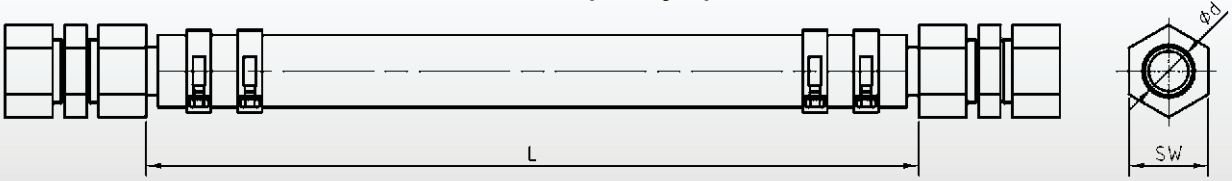
Water cooled hollow core cables 300-1000 mm² with heat resistant hoses for medium frequency up to 2000 hertz

Part-No.	technical data															
	cross-section	current-load in A by				dimensions mm										
	mm²	50 Hz	500 Hz	1000 Hz	2000 Hz	L_1	L_2	L_3	L_4	B	B_1	d	G	S	L	
30673	300	3700	3300	3100	2900	20	40	80	95	42	37	18	3/8 ”	20	according to customers' wishes	
30674	400	4500	4100	3800	3600	20	40	80	95	50	43,3	18	3/8 ”	25		
30675	500	5500	5000	4800	4600	20	40	80	95	55	49	18	3/8 ”	25		
30676	600	6200	5600	5400	5100	20	40	80	95	60	52	18	3/8 ”	30		
30677	700	7100	6000	5800	5400	20	40	80	95	60	52	18	3/8 ”	30		
30678	800	8000	7100	6700	5900	25	50	100	115	70	63,3	22	3/8 ”	30		
30679	1000	10000	7500	6800	6000	25	50	100	115	70	63,3	22	3/8 ”	30		

Water cooled hollow core cables 70-1015 mm² with heat resistant hoses for medium frequency up to 10000 hertz

Part-No.	technical data															
	cross-section	current-load in A by					dimensions mm									
	mm²	50 Hz	1000 Hz	2000 Hz	4000 Hz	10000 Hz	L_1	L_2	L_3	L_4	B	B_1	d	G	S	L
30610	70	950	920	900	800	700	12,5	25	50	65	25	22,9	11	1/4 ‘’	10	according to customers' wishes
30611	105	1400	1300	1200	1100	900	15	30	60	75	30	27,5	14	3/8 ‘’	12	
30612	140	1900	1700	1600	1500	1350	15	30	60	75	35	31,6	14	3/8 ”	15	
30613	175	2300	2000	1900	1750	1550	20	40	80	95	42	36,9	18	3/8 ”	20	
30614	210	2750	2400	2250	2100	1750	20	40	80	95	42	36,9	18	3/8 ”	20	
30680	315	3800	3250	3050	2800	1900	20	40	80	95	42	36,9	18	3/8 ”	20	
30681	420	4600	4100	3850	3450	2200	20	40	80	95	50	43,3	18	3/8 ”	25	
30682	525	5600	5000	4850	4000	2500	20	40	80	95	55	49	18	3/8 ”	25	
30683	630	6700	6000	5700	4800	3000	20	40	80	95	60	52	18	3/8 ”	30	
30684	700	7500	6300	5900	5300	3400	20	40	80	95	60	52	18	3/8 ”	30	
30685	805	8500	7200	6400	5700	3700	25	50	100	115	70	63,3	22	3/8 ”	30	
30686	1015	10000	7400	6600	-	-	25	50	100	115	70	63,3	22	3/8 ”	30	

Water cooled cables for pipe connections with heat resistance hoses for medium frequency up to 2000 hertz



Design with pipe connections on both sides

When placing an order please specify:

- conductor cross-section and current load
- diameter of the tube/clamping-Ø of the pipe connector
- length/dimension L acc. to our drawing

Remark:
Pipe connectors without cable for the connection of two tubes are contained in this catalogue on page 50.

Water cooled high current cables with solderless pressed cable heads preferably for electric arc- and ladle furnaces

Cables in standard design up to conductor cross-section of 6000 mm²

Special coolant water hose with traffic light effect as early warning system

Construction and application

Manufactured out of several flexible, stranded copper ropes with a cross-section range of 400 mm² or 500 mm² wounded around a supporting tube. We use stranded ropes in special construction and every second single conductor rope is protected against abrasion with a perforated hose. The wire-Ø and the construction of the ropes are so selected that the mechanical wear is minimized. Preferably such cables are used inside of electric arc- and ladle furnaces.

Connectors and cooling

All standard connectors/cable heads are manufactured out of E-copper material and are crimped on the E-copper conductor without soldering. Using our druseidt crimping technology, only materials of the same conductance value are connected together, without the use of additional materials, such as solder or welding additives. This ensures the best possible loss-free current transmission. The geometry and positioning of crimping facilitates enable the best possible coolant water flow.

Coolant water connections holes/hose nipples

Thread holes of a sufficient size are made in front as well as at the side of the cable heads to hold hose nipples or tubing connectors. To realize an optimal cooling process we equip the cable heads with one separate borehole per single conductor rope. The position of the drilling is selected in that way, that an optimized water flow is guaranteed. The cable is delivered without nipples as standard. These can be additionally ordered as accessories e.g. according to our catalogue page 50.

Coolant water hoses

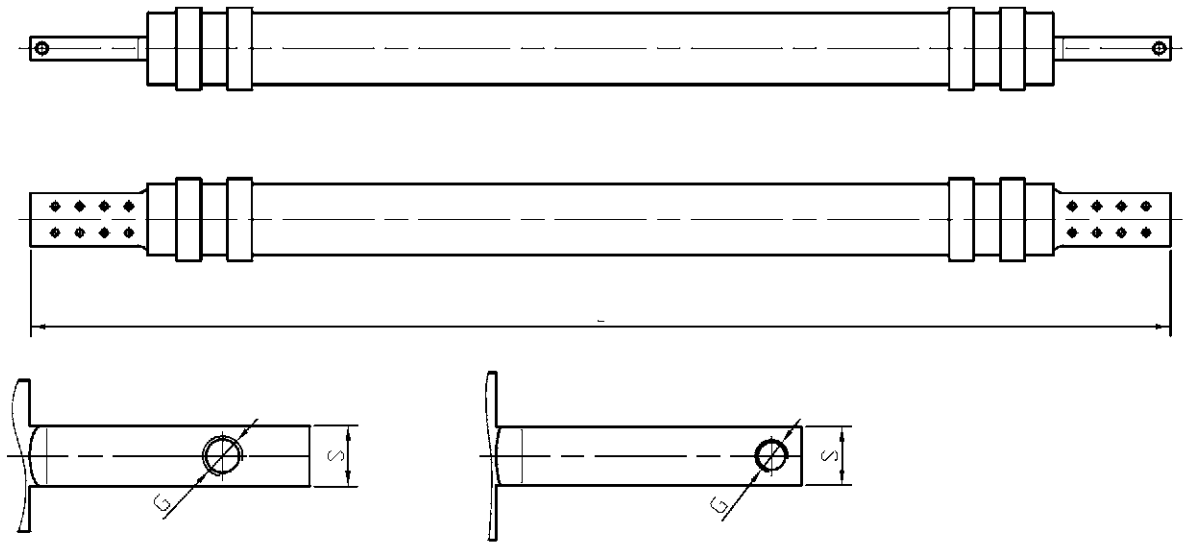
The flexible coolant water hoses we use are fitted with additional heat protection against radiated heat and liquid metal splashing. The hose casing is non flammable and self extinguishing. In standard design we use a high quality tube, non conductive, with excellent physical properties and extremely resistance to abrasion. To control the wear and the abrasion the tube is equipped with a so called traffic-light effect, which based on the green respectively red rubber layer inside of the hose casing. So it is possible to control the tube condition optically. The latest moment for changing and repairing the cables should be given when the red rubber layer is visible.

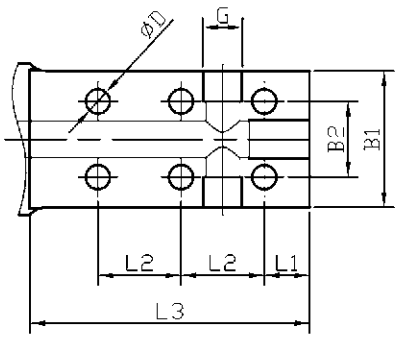
Allowed working pressure:	max. 6 bar
Testing pressure:	10 bar
Current load:	As approximate value we recommend circa 4,5 A/mm²

Special designs and cable repairs

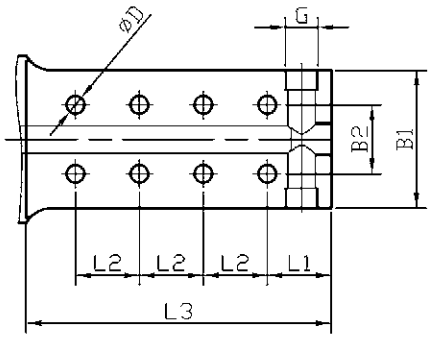
As desired we manufacture high current cables according to your drawings or wishes also with rotated joints or mounted bumpers. Fast repair of all common types of cables, ours as well as those of other manufacturers, belong to our service and delivery program.

Water cooled high current cables
with solderless pressed cable heads
preferably for electric arc- and ladle furnaces

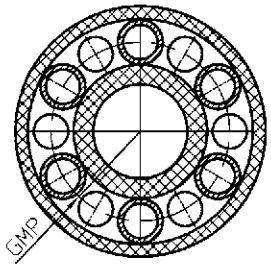




Part-No. 30510-30511



Part-No. 30512-30520

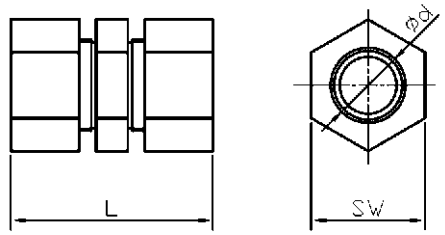


Part-No.	technical data													
	cable constr. n x mm²	cross-section mm²	outer hose l Ø x ca.S		dimensions mm									
				L	L_1	L_2	L_3	B_1	B_2	d	G	S	GMR
30510	5 x 400	2000	100 x 13	according to customers' wishes	30	55	185	90	50	16	3/4'"	40	34,5
30511	6 x 400	2400	100 x 13		30	55	185	90	50	16	3/4'"	40	34,5
30512	7 x 400	2800	115 x 13,5		30	60	255	100	60	16	1"	50	42
30513	8 x 400	3200	125 x 13,5		30	60	255	100	60	18	1"	50	47
30514	9 x 400	3600	133 x 14		30	60	290	120	65	18	1"	50	51
30515	10 x 400	4000	150 x 14		30	60	290	130	65	18	1"	50	59,5
30516	11 x 400	4400	160 x 14		65	65	310	130	70	18	1"	50	64,5
30517	12 x 400	4800	170 x 14		65	65	310	140	70	18	1"	60	69,5
30518	13 x 400	5200	180 x 14		65	65	310	140	70	18	1"	60	74,5
30519	14 x 400	5600	180 x 14		65	65	310	140	70	18	1"	60	74,5
30520	15 x 400	6000	200 x 14		65	65	310	140	70	18	1"	60	84,5

Remark:
Additionally to the standardized designs according to the table above we manufacture such cables in different constructions e.g. consisting out of ropes with a conductor cross-section of 500 mm² or according to your wishes or drawings.

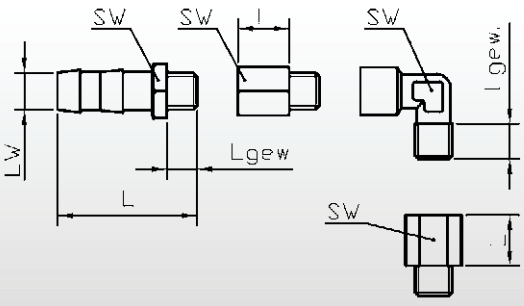
Pipe connectors
material: brass uncoated

To realize current leading, watertight connections inside of pipe systems our special pipe connectors are needed. They enable a connection between two tubes as well as connections between tubes and water cooled cables or tubing connectors of contact plates. They can be delivered as simple connector as well as directly mounted on a water cooled cable according to our catalogue page 46/47.
Material of the standard design is brass with uncoated copper clamping rings. Other materials like stainless steel or with silvered clamping rings are available on request.



Part-No.	technical data			
	for tubing conductor Ø d	dimensions mm connect. length min.	Sw	L
15490	28	45	50	90
15491	30	45	50	90
15492	35	45	60	90
15493	40	45	65	95
15494	42	45	65	95
15495	48	45	70	95
15496	50	50	70	105
15497	60	50	80	105
15498	70	50	90	105

Water hose connectors, elbows and extension nipples
with external/internal thread
material: brass, uncoated



Part-No.	technical data				
		dimensions mm			
	thread	Sw	Lw	Lgew	L
water hose connectors					
15448	1/4 "	19	13	10	48
15449	3/8 "	19	13	10	48
15450	1/2 "	24	13	10	50
15451	3/4 "	27	19	11	50
15452	1 "	38	25	11	51
elbows					
15458	1/4 "	13	-	12	-
15459	3/8 "	17	-	12	-
15460	1/2 "	21	-	15	-
15461	3/4 "	26	-	15	-
15462	1 "	30	-	16	-
extension nipples					
15468	1/4 "	17	-	-	18
15469	3/8 "	19	-	-	19
15470	1/2 "	24	-	-	22
15471	3/4 "	17	-	-	30
15472	1 "	22	-	-	40

Remark:
Part-No. 15471 and 15472 sw = hexagonal area inside of the nipples

Coolant water hoses
without additional thermal protection

Part-No.	technical data		
	dimensions mm		
	Inside-Ø	wall thickness ca.	description
15473	25	4,5	stabilized, flexible rubber hose
15474	28	4,5	suitable for welding roboter applic.
15475	32	4,5	operating pressure : max. 10 bar
15476	35	4,5	burst pressure: circa 30 bar
15477	38	5,0	temperature range: up to +100° C
15478	42	5,0	dielectric strength: 5 kV/mm

Coolant water hoses
with additional thermal protection

Part-No.	technical data		
	dimensions mm		
	Inside-Ø	wall thickness ca.	description
15432	25	6,0	special tube with an additional ther-
15433	30	6,5	mal protection against radiated
15434	35	8,0	heat and liquid metal splashing
15435	42	8,0	with flame retardant,
15435/50	50	8,0	self extinguishing cover
15436	55	8,0	operating pressure: max. 10 bar
15436/60	60	9,0	burst pressure: > 30 bar
15437	70	9,0	temp. range: up to +100° C
15437/80	80	10,0	dielectric strength: 6 kV/mm
15438	90	10,0	
15439	100	10,0	

Stainless steel clamps

Part-No.	technical data		
	dimensions mm		
	clamping-Ø	width	description
15480	16 - 25	12	stainless steel clamps used in
15481	20 - 32	12	areas where extremely high band
15482	25 - 40	12	tensile forces are required.
15483	35 - 40	12	With its tensile strength, the high
13040	40 - 60	12	fracture torque and even tension
15484	50 - 70	12	force distribution, the clamps are
13041	60 - 80	12	well suited inside of cooling water
15485	70 - 90	12	connections.
13042	80 -100	12	
15486	90 -110	12	
15487	110 -130	12	

Flexible connectors
made out of copper- and aluminium foils

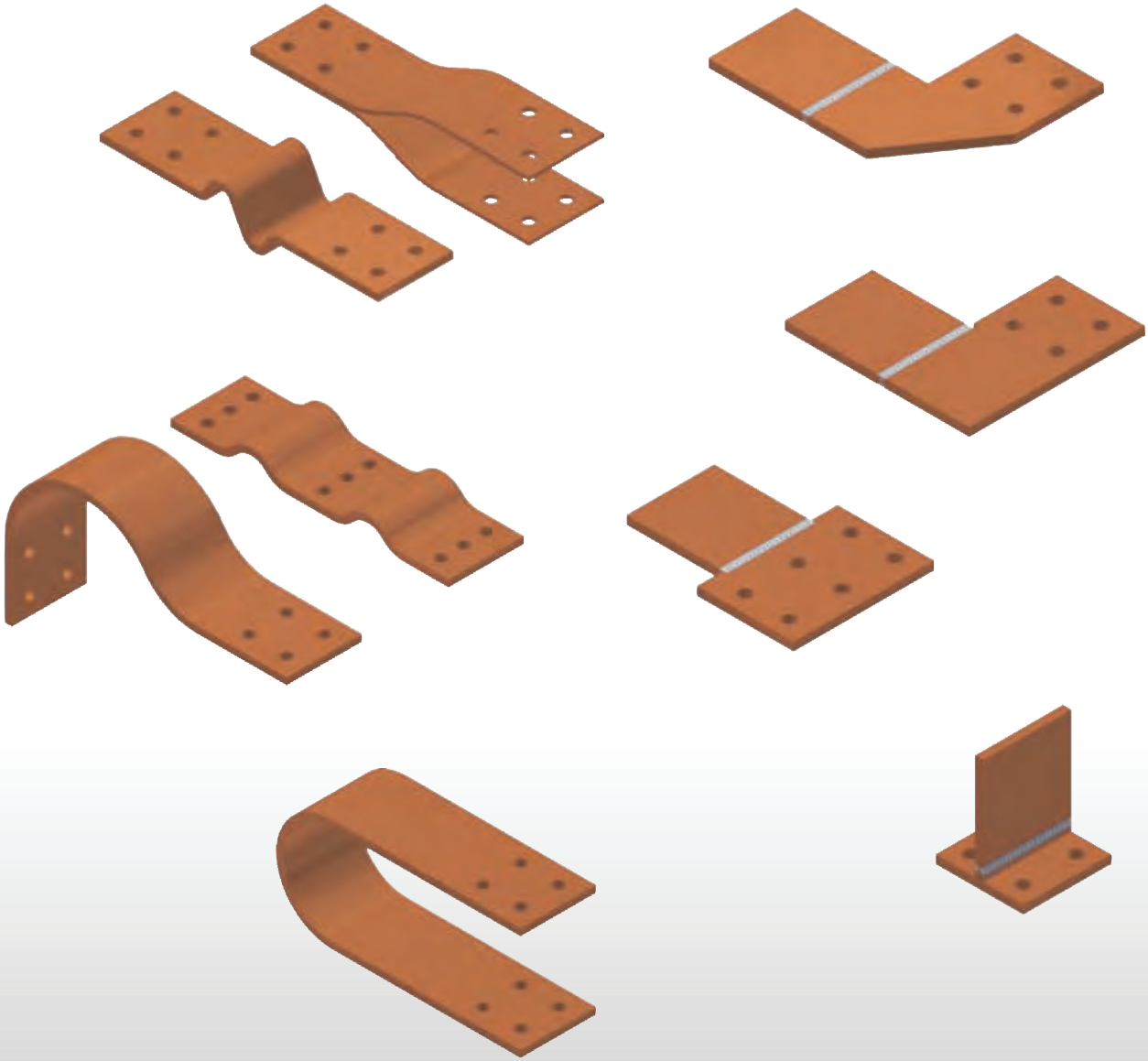
Construction and application

Flexible connectors consisting out of to packages stakked copper or aluminium strips. The contact areas are compacted by special welding or riveting processes. So we get contact elements with a constant conductor cross-section about the whole connector length. Additionally it is possible to weld bended busbar pieces, clamps or other solid copper parts on to the flexible foil packages.

Such connectors have become particularly well established as connections between transformers, generators, rectifiers or switching devices and prefabricated networks. They can compensate expansions caused by an increase of temperature as well as movements caused by vibrations of switchgears, transformers or generators. Another part is utilized as flexible components to realize movements inside of machine parts, contactors or welding guns e.g. according to catalogue page 38.

We produce a wide range of laminated connectors in coordination with your required applications.

Also the contact areas can be fitted to the technical requirements.



Flexible connectors made out of copper- and aluminium foils

We offer a wide range of standardized laminated connectors as well as multifarious designs according to your drawings or wishes. All articles are produced in high quality on modern plants with suitable materials and manufacturing processes in coordination with your applications. Following manufacturing processes are at our disposal:

- press-/diffusion welding
- inert gas welding (WIG/MIG)
- electron-beam welding
- soldering/brazing
- riveting
- extrusion of insulated supple bars

Take the chance to profit from our experience in designing and manufacturing of flexible high current components and contact us. With pleasure our employees assist your company in finding optimal solutions.

Flexible expansion connectors material: copper HCP-foils contact areas: press-welded

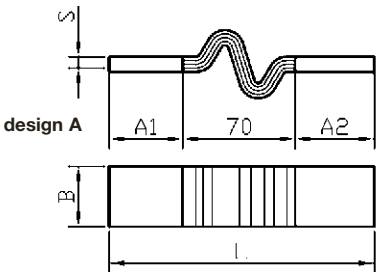
The expansion connectors in the following tables consist out of copper HCP-foils according to DIN EN 13599 with a thickness of 0,1 mm or 0,3 mm. The contact areas are manufactured in a press-welded design.
The press-welding procedure is a special resistance welding process, which enables a welding of packages of copper foils with different strength in a defined area together. By working with this procedure it is not necessary to use any form of welding additives.
So press-welded connectors are excellent electrical conductors due to their perfect molecular connection. The contact areas can be bored, milled or bent without problem. The width of the contact areas are so selected that it is possible to install several expansion connectors in a distance of 2 mm side by side (e.g. for generator connections etc.). With drilling on request, e.g. according to DIN 43673 page 1 + 2, DIN 46206 page 2 or according to your drawings/samples or wishes.
On request it is also possible to deliver designs with coated contact areas (e.g. tinned or silvered).

When placing an order, please specify:

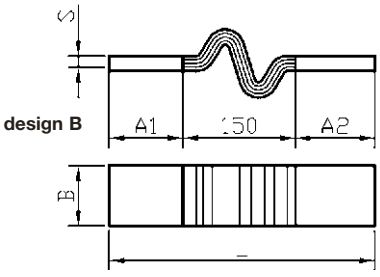
- Part-No.
- thickness of the foils (0,1 mm or 0,3 mm)
- design A, B or C
- length of the contact areas A1/A2
- with or without drilling

Example:

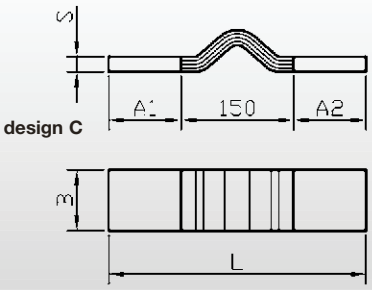
- Part-No. 15509 (B x S = 98 x 10 mm)
- design B (expansion part 150 mm)
- contact areas A1/A2 100 mm = total length 350 mm (100 + 100 + 150 mm)
- thickness of the foils 0,1 mm
- without drilling



design A



design B



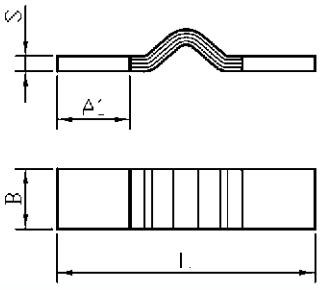
design C

	Part-No.	technical data				
		cross-section mm²	dimensions mm B	S	A_1	A_2
	15500	140	28	5	according to customers' wishes	according to customers' wishes
	15501	190	38	5		
	15502	240	48	5		
	15503	290	58	5		
	15504	390	78	5		
	15505	380	38	10		
	15506	480	48	10		
	15507	580	58	10		
	15508	780	78	10		
	15509	980	98	10		
	15510	570	38	15		
	15511	720	48	15		
	15512	870	58	15		
	15513	1170	78	15		
	15514	1470	98	15		
	15515	760	38	20		
	15516	960	48	20		
	15517	1160	58	20		
	15518	1560	78	20		
	15519	1960	98	20		

Remark:
The minimum current capacity of expansion connectors is in accordance with the values of solid busbars (cf. DIN 43671 resp. DIN 46276 part 1 + 2).

Flexible expansion connectors material: copper HCP-foils contact areas: press-welded

Expansion connectors in standard design. The width and the thickness of the contact areas are in coordination with the usual dimensions of the traditional busbar systems. With drilling on request, e.g. according to DIN 43673 page 1 +2, DIN 46206 page 2 or according to your drawings/samples or wishes. On request it is also possible to deliver expansion connectors with other dimensions or in bended design according to your drawings as well as with coated contact areas (e.g. tinned or silvered).



Part-No.	technical data					
	cross-section mm²	dimensions mm B	A_1	S	L	weight kg/piece
15730	200	40	40	5	230	0,48
15731	320	40	40	8	230	0,77
15732	400	40	40	10	230	0,96
15733	480	40	40	12	230	1,15
15734	600	40	40	15	230	1,28
15735	800	40	40	20	230	1,92
15736	250	50	50	5	250	0,65
15737	400	50	50	8	250	1,04
15738	500	50	50	10	250	1,30
15739	600	50	50	12	250	1,55
15740	750	50	50	15	250	1,95
15741	1000	50	50	20	250	2,60
15742	300	60	60	5	270	0,83
15743	480	60	60	8	270	1,33
15744	600	60	60	10	270	1,66
15745	720	60	60	12	270	1,99
15746	900	60	60	15	270	2,51
15747	1200	60	60	20	270	3,32
15748	400	80	80	5	310	1,25
15749	640	80	80	8	310	1,99
15750	800	80	80	10	310	2,50
15751	960	80	80	12	310	3,01
15752	1200	80	80	15	310	3,75
15753	1600	80	80	20	310	5,00
15754	500	100	100	5	350	1,74
15755	800	100	100	8	350	2,81
15756	1000	100	100	10	350	3,48
15757	1200	100	100	12	350	4,17
15758	1500	100	100	15	350	5,27
15759	2000	100	100	20	350	6,96
15760	2500	100	100	25	350	8,70
15761	600	120	120	5	390	2,26
15762	960	120	120	8	390	3,68
15763	1200	120	120	10	390	4,52
15764	1440	120	120	12	390	5,50
15765	1800	120	120	15	390	6,97
15766	2400	120	120	20	390	9,04
15767	3000	120	120	25	390	11,57
15768	800	160	160	5	470	3,64
15769	1280	160	160	8	470	5,99
15770	1600	160	160	10	470	7,28
15771	1920	160	160	12	470	8,72
15772	2400	160	160	15	470	11,02
15773	3200	160	160	20	470	14,56
15774	4000	160	160	25	470	18,26
15775	4800	160	160	30	470	21,84

Remark:
The minimum current capacity of expansion connectors is in accordance with the values of solid busbars (cf. DIN 43671 resp. DIN 46276 part 1 + 2).

Flexible expansion connectors
material: aluminium foils
contact areas: inert gas welded

The laminates of our standard aluminium expansion connectors consist out of pure aluminium foils with a thick-ness of 0,3 mm. As contact areas we use solid aluminium pieces. They are welded by an electrical arc and shielded with inert gas to prevent oxidation of the molten bath.
The width of the contact areas are so selected that it is possible to install several expansion connectors in a distance of 2 mm side by side (e.g. for generator connections etc.).
With drilling on request, e.g. according to DIN 43673 page 1 + 2, DIN 46206 page 2 or according to your drawings/samples or wishes.

When placing an order, please specify:

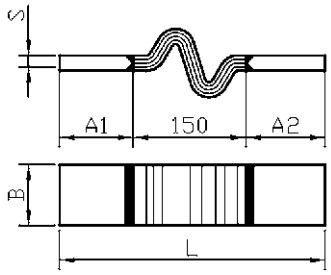
- Part-No.
- design B or C
- length of the contact areas A1/A2
- with or without drilling

Example:

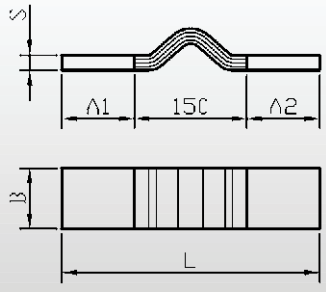
- Part-No. 15534 (B x S = 98 x 10 mm)
- design C
- contact areas A1/A2 100 mm = total length 350 mm (100 + 100 + 150 mm)
- without drilling

Part-No.	technical data				
	cross-section	dimensions mm			
	mm²	B	S	A_1	A_2
15530	380	38	10	according to customers' wishes	according to customers' wishes
15531	480	48	10		
15532	580	58	10		
15533	780	78	10		
15534	980	98	10		
15535	570	38	15		
15536	720	48	15		
15537	870	58	15		
15538	1170	78	15		
15539	1470	98	15		
15540	760	38	20		
15541	960	48	20		
15542	1160	58	20		
15543	1560	78	20		
15544	1960	98	20		

design B

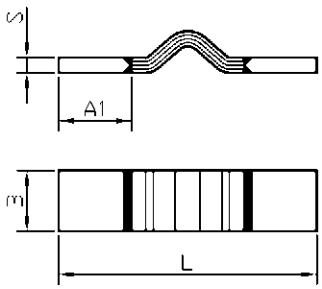


design C



Remark:
The minimum current capacity of expansion connectors is in accordance with the values of solid busbars (cf. DIN 43670 resp. DIN 46276 part 1 + 2).

Flexible expansion connectors
material: aluminium foils
contact areas: inert gas welded



Expansion connectors in standard design. The width and the thickness of the contact areas are in coordination with the usual dimensions of the traditional busbar-systems. With drilling on request, e.g. according to DIN 43673 page 1 + 2, DIN 46206 page 2 or according to your drawings/samples or wishes. On request it is also possible to deliver expansion connectors with other dimensions or in bended design according to your drawings.

Remark:
The minimum current capacity of expansion connectors is in accordance with the values of solid busbars (cf. DIN 43670 resp. DIN 46276 part 1 + 2).

Part-No.	technical data					
	cross-section mm²	dimensions mm B	A_1	S	L	weight kg/piece
03030	200	40	40	5	250	0,16
03031	400	40	40	10	250	0,32
03032	600	40	40	15	250	0,48
03033	200	40	80	5	280	0,18
03034	400	40	80	10	280	0,36
03035	600	40	80	15	310	0,57
03036	250	50	50	5	270	0,22
03037	500	50	50	10	270	0,43
03038	250	50	80	5	300	0,25
03039	500	50	80	10	300	0,47
03040	750	50	80	15	310	0,71
03041	300	60	60	5	290	0,28
03042	600	60	60	10	290	0,55
03043	300	60	80	5	300	0,29
03044	600	60	80	10	300	0,56
03045	900	60	80	15	310	0,87
03046	800	80	80	10	330	0,82
03047	1200	80	80	15	330	1,30
03048	1000	100	100	10	370	1,20
03049	1500	100	100	15	370	1,70
03050	1200	120	120	10	410	1,50
03051	1800	120	120	15	410	2,20
03052	1600	160	160	10	490	2,30

Flexible transformer connections
with expansion part

Every time, when transformers have current connections shaped as tubing connectors instead of rectangular busbars, special contact elements are needed. For such applications we offer our flexible copper connectors consisting out of an expansion part and special clamps on one or both sides. They are deliverable for current capacities up to some thousand amps and are individual designed in coordination with the power and the dimensions of the transformer. Main applications are inside of steel industrial plants. Our connectors are deliverable with special clamps on one and rectangular contact area at the other side as well as with clamps on both sides. So it is possible to connect the tubing connectors of the transformer with power leading tube systems as well as with prefabricated busbar systems. In dependence of the current load the connectors are equipped with an expansion part on the top as well as on the top and on the bottom part of the clamp.

PVC insulated supple bars insulated by a black vinyl compound, standard length 2 m

Construction and application

Supple bars are insulated flat electrical conductors. They consist of several layers of uncoated or tin plated Cu-ETP strips (99,9% copper) and are insulated with a flexible high quality vinyl compound. This special compound is self-extinguishing and free of lead. The flexibility of the bars offers an installation into difficult equipment or small places. They have become particularly well established as connectors in switchgears and between transformers, generators, switching devices and prefabricated power networks up to a operating voltage of 1 kV. As a consequence of their large surface area and hence their favourable thermal radiation properties, they can handle heavier current loads than solid busbars of the same cross-section. So it is possible to use components with smaller dimensions. The elasticity of the vinyl compound realizes a deforming of bars also when working with larger cross-sections.
The connection level can also be changed by bending and twisting through 180°.
Our supple bars enable an individual fitting of the components, a reduction of the cross-section and a reduction of the installation time. So they are a very interesting cost-saving product.

Technical data

Electrical conductor

- copper strips Cu-ETP (99,9% copper)
- surface uncoated or tinned
- stability > = 200 N/mm²
- electrical conductivity 57 S x m/mm²

Insulation

- special vinyl compound
- black, free of lead
- thickness 1,8-2 mm
- self-extinguishing acc. to UL 94 VO
- shore hardness 85 A
- elasticity 365%
- AC voltage between potential and insulating material 16,5 kV
- AC voltage between two insulated supple bars in contact 33 kV
- operating voltage max 1 kV
- operating temperature -20° C up to +105° C

Installation

Simple mounting by drilling, punching or underside clamping. The copper strips are sliding when bending the bars, therefore it is necessary to bend the bars before starting the cutting, drilling or punching process.
To prevent a displacement of the copper strips a tightly clamping of the bars is necessary too when carrying out the drilling or punching process.

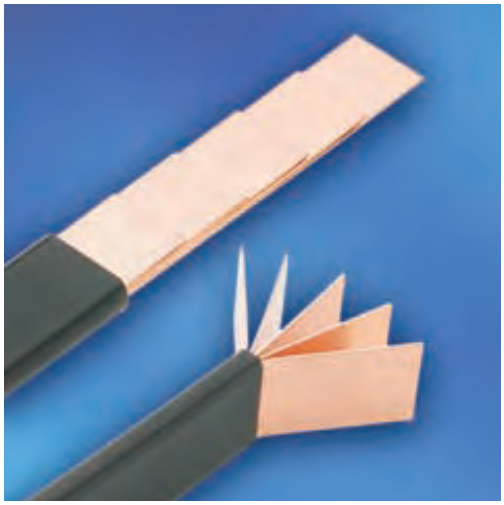
PVC insulated supple bars
made out of uncoated or tin plated Cu-ETP strips
insulated by a black vinyl compound, standard length 2 m

Part-No.		technical data							
		cross-section	copper-strips	current load in dependence of the conductor heat in °C					copper weight
uncoated	tinned	mm²	number x dimension mm	65°	75°	85°	95°	105°	kg/% m
15650	**15650 vz**	14,4	2 x 9 x 0,8	95 A	114 A	130 A	144 A	157 A	13,80
15651	**51700***	21,6	3 x 9 x 0,8	119 A	141 A	162 A	180 A	196 A	20,70
15652	**15652 vz**	28,8	4 x 9 x 0,8	139 A	166 A	190 A	211 A	230 A	27,60
15653	**15653 vz**	36	5 x 9 x 0,8	158 A	189 A	215 A	240 A	262 A	34,50
15654	**51705***	43,2	6 x 9 x 0,8	176 A	210 A	240 A	266 A	291 A	41,40
15655	**15655 vz**	13	2 x 13 x 0,5	97 A	116 A	132 A	147 A	160 A	12,50
15656	**51710***	19,5	3 x 13 x 0,5	120 A	143 A	163 A	181 A	198 A	18,70
15657	**15657 vz**	26	4 x 13 x 0,5	140 A	166 A	190 A	211 A	231 A	25,00
15658	**51715***	39	6 x 13 x 0,5	174 A	207 A	237 A	263 A	288 A	37,50
15661	**15661 vz**	24,8	2 x 15,5 x 0,8	141 A	168 A	192 A	214 A	234 A	23,80
15662	**51720***	49,6	4 x 15,5 x 0,8	205 A	244 A	279 A	310 A	339 A	47,60
15663	**51725***	74,4	6 x 15,5 x 0,8	257 A	306 A	350 A	389 A	424 A	71,40
15664	**15664 vz**	99,2	8 x 15,5 x 0,8	303 A	361 A	412 A	458 A	501 A	95,20
15665	**51730***	124	10 x 15,5 x 0,8	345 A	411 A	470 A	523 A	571 A	119,00
15666	**15666 vz**	40	2 x 20 x 1	193 A	230 A	263 A	292 A	319 A	38,30
15667	**15667 vz**	60	3 x 20 x 1	240 A	286 A	326 A	363 A	396 A	57,50
15668	**15668 vz**	80	4 x 20 x 1	280 A	334 A	381 A	424 A	463 A	76,60
15669	**15669 vz**	100	5 x 20 x 1	317 A	377 A	431 A	479 A	523 A	95,80
15670	**15670 vz**	120	6 x 20 x 1	351 A	418 A	477 A	531 A	580 A	115,00
15671	**15671 vz**	160	8 x 20 x 1	413 A	492 A	562 A	625 A	683 A	153,30
15672	**15672 vz**	200	10 x 20 x 1	470 A	560 A	640 A	711 A	777 A	191,60
51731	**51732***	240	11 x 20 x 1	497 A	592 A	676 A	752 A	821 A	229,90
15673	**15673 vz**	48	2 x 24 x 1	223 A	265 A	303 A	337 A	368 A	46,00
15674	**15674 vz**	72	3 x 24 x 1	276 A	329 A	375 A	417 A	456 A	69,00
15675	**15675 vz**	96	4 x 24 x 1	322 A	383 A	438 A	487 A	532 A	92,00
15676	**15676 vz**	120	5 x 24 x 1	363 A	433 A	494 A	550 A	600 A	115,00
15677	**15677 vz**	144	6 x 24 x 1	402 A	479 A	547 A	608 A	664 A	138,00
15678	**15678 vz**	192	8 x 24 x 1	471 A	562 A	641 A	713 A	779 A	183,90
15679	**51735 ***	240	10 x 24 x 1	534 A	637 A	727 A	809 A	883 A	229,90
15690	**15690 vz**	64	2 x 32 x 1	280 A	334 A	382 A	424 A	463 A	61,30
15691	**15691 vz**	96	3 x 32 x 1	346 A	413 A	471 A	524 A	572 A	92,00
15692	**15692 vz**	128	4 x 32 x 1	403 A	480 A	548 A	610 A	666 A	122,60
15693	**15693 vz**	160	5 x 32 x 1	453 A	540 A	617 A	686 A	749 A	153,30
15694	**15694 vz**	192	6 x 32 x 1	500 A	596 A	680 A	756 A	826 A	183,90
15695	**15695 vz**	256	8 x 32 x 1	583 A	695 A	793 A	882 A	963 A	245,30
15696	**15696 vz**	320	10 x 32 x 1	657 A	783 A	894 A	995 A	1086 A	306,60
15697	**15697 vz**	120	3 x 40 x 1	415 A	494 A	565 A	628 A	686 A	115,00
15698	**15698 vz**	160	4 x 40 x 1	481 A	574 A	655 A	729 A	796 A	153,30
15699	**15699 vz**	200	5 x 40 x 1	541 A	644 A	736 A	818 A	894 A	191,60
15700	**15700 vz**	240	6 x 40 x 1	594 A	708 A	809 A	900 A	982 A	229,90
15701	**15701 vz**	320	8 x 40 x 1	690 A	822 A	939 A	1044 A	1140 A	306,60
15702	**15702 vz**	400	10 x 40 x 1	774 A	922 A	1053 A	1171 A	1279 A	383,20
15703	**15703 vz**	200	4 x 50 x 1	577 A	688 A	786 A	874 A	954 A	191,60
15704	**15704 vz**	250	5 x 50 x 1	646 A	770 A	880 A	978 A	1068 A	239,50
15705	**15705 vz**	300	6 x 50 x 1	709 A	844 A	965 A	1073 A	1171 A	287,40
15706	**15706 vz**	400	8 x 50 x 1	818 A	975 A	1114 A	1238 A	1352 A	383,20
15707	**15707 vz**	500	10 x 50 x 1	914 A	1089 A	1244 A	1383 A	1510 A	479,00
15708	**15708 vz**	252	4 x 63 x 1	698 A	832 A	950 A	1056 A	1153 A	241,40
15709	**15709 vz**	315	5 x 63 x 1	779 A	929 A	1061 A	1179 A	1288 A	301,80
15710	**15710 vz**	378	6 x 63 x 1	852 A	1015 A	1159 A	1289 A	1408 A	362,10
15711	**15711 vz**	504	8 x 63 x 1	978 A	1166 A	1332 A	1481 A	1617 A	482,80
15712	**15712 vz**	630	10 x 63 x 1	1088 A	1296 A	1481 A	1646 A	1798 A	603,50
15713	**15713 vz**	400	5 x 80 x 1	947 A	1128 A	1289 A	1433 A	1565 A	383,20
15714	**15714 vz**	480	6 x 80 x 1	1032 A	1229 A	1404 A	1562 A	1705 A	459,80
15715	**15715 vz**	640	8 x 80 x 1	1179 A	1405 A	1604 A	1784 A	1948 A	613,10
15716	**15716 vz**	800	10 x 80 x 1	1305 A	1556 A	1777 A	1976 A	2157 A	766,40
15717	**15717 vz**	500	5 x 100 x 1	1136 A	1354 A	1546 A	1720 A	1878 A	479,00
15718	**15718 vz**	600	6 x 100 x 1	1235 A	1471 A	1681 A	1869 A	2041 A	574,80
15720	**15720 vz**	800	8 x 100 x 1	1404 A	1674 A	1912 A	2126 A	2321 A	766,40
15722	**15722 vz**	1000	10 x 100 x 1	1550 A	1848 A	2110 A	2347 A	2562 A	958,00

Remark:
Stocked standard design bare and the * marked tinned designs.
In special design all dimensions are deliverable with a tin coated surface and in variable lengths (e.g. 3 m). All information about current load are approximate values in consideration of the cables heat for single laying of air cooled cables and ambient temperature +35° C.

The temperature of the conductor is in dependent on the installation, the application, the cooling, the ambient temperature etc., so that if necessary reducing factors are to be considered. With pleasure our employees assist your company in finding optimal solutions.

Insulated supple bars, free of halogen made out of bare Cu-ETP strips insulated by a black thermoplastic, standard length 2 m



Construction and application

Construction according to the PVC-insulated design but insulated by an extruded high quality thermoplastic. The insulating material is free of halogen and suitable for all applications which requires a halogen free design of connectors. The material combined with the special injection moulding process realizes a manufacturing of flexible bars. The hardness of the material is a little bit stronger compared with the PVC-material but it offer although a good deformation of the bars.

Installation

Simple mounting by drilling, punching or underside clamping. The copper strips are sliding when bending the bars, therefore it is necessary to bend the bars before starting the cutting, drilling or punching process. To prevent a displacement of the copper strips a tightly clamping of the bars is necessary too when carrying out the processes.

Technical data

Electrical conductor

- copper strips cu-ETP (99,9% copper)
- surface uncoated or tinned
- stability > = 200 N/mm²
- electrical conductivity 57 S x m/mm²

Insulation

- special thermoplastic
- black, free of halogen
- thickness 1,8-2 mm
- self-extinguishing
- shore hardness 85 A
- elasticity 185%
- AC voltage between potential and insulating material 16,5 kV
- AC voltage between two insulated supple bars in contact 33 kV
- operating voltage max 1 kV
- operating temperature -20° C up to +105° C

Part-No.	technical data							
	cross-section	copper-strips	current load in dependence of the conductor heat in °C					copper weight
uncoated	mm²	number x dimension mm	65°	75°	85°	95°	105°	kg/% m
19000	14,4	2 x 9 x 0,8	95 A	114 A	130 A	144 A	157 A	13,80
19001	21,6	3 x 9 x 0,8	119 A	141 A	162 A	180 A	196 A	20,70
19002	28,8	4 x 9 x 0,8	139 A	166 A	190 A	211 A	230 A	27,60
19003	36	5 x 9 x 0,8	158 A	189 A	215 A	240 A	262 A	34,50
19004	43,2	6 x 9 x 0,8	176 A	210 A	240 A	266 A	291 A	41,40
19010	13	2 x 13 x 0,5	97 A	116 A	132 A	147 A	160 A	12,50
19011	19,5	3 x 13 x 0,5	120 A	143 A	163 A	181 A	198 A	18,70
19012	26	4 x 13 x 0,5	140 A	166 A	190 A	211 A	231 A	25,00
19014	39	6 x 13 x 0,5	174 A	207 A	237 A	263 A	288 A	37,50
19016	52	8 x 13 x 0,5	204 A	243 A	278 A	309 A	338 A	50,00
19018	65	10 x 13 x 0,5	232 A	276 A	316 A	351 A	383 A	67,40
19019	24,8	2 x 15,5 x 0,8	141 A	168 A	192 A	214 A	234 A	23,80
19021	49,6	4 x 15,5 x 0,8	205 A	244 A	279 A	310 A	339 A	47,60
19023	74,4	6 x 15,5 x 0,8	257 A	306 A	350 A	389 A	424 A	71,40
19025	99,2	8 x 15,5 x 0,8	303 A	361 A	412 A	458 A	501 A	95,20
19027	124	10 x 15,5 x 0,8	345 A	411 A	470 A	523 A	571 A	119,00
19028	40	2 x 20 x 1	193 A	230 A	263 A	292 A	319 A	38,30
19029	60	3 x 20 x 1	240 A	286 A	326 A	363 A	396 A	57,50
19030	80	4 x 20 x 1	280 A	334 A	381 A	424 A	463 A	76,60
19031	100	5 x 20 x 1	317 A	377 A	431 A	479 A	523 A	95,80
19032	120	6 x 20 x 1	351 A	418 A	477 A	531 A	580 A	115,00
19034	160	8 x 20 x 1	413 A	492 A	562 A	625 A	683 A	153,30
19036	200	10 x 20 x 1	497 A	592 A	676 A	752 A	821 A	191,60
19037	48	2 x 24 x 1	223 A	265 A	303 A	337 A	368 A	46,00
19038	72	3 x 24 x 1	276 A	329 A	375 A	417 A	456 A	69,00
19039	96	4 x 24 x 1	322 A	383 A	438 A	487 A	532 A	92,00
19040	120	5 x 24 x 1	363 A	433 A	494 A	550 A	600 A	115,00
19050	320	10 x 32 x 1	657 A	783 A	894 A	995 A	1086 A	306,60
19052	120	3 x 40 x 1	415 A	494 A	565 A	628 A	686 A	115,00
19053	160	4 x 40 x 1	481 A	574 A	655 A	729 A	796 A	153,30
19054	200	5 x 40 x 1	541 A	644 A	736 A	818 A	894 A	191,60
19055	240	6 x 40 x 1	594 A	708 A	809 A	900 A	982 A	229,90
19057	320	8 x 40 x 1	690 A	822 A	939 A	1044 A	1140 A	306,60
19059	400	10 x 40 x 1	774 A	922 A	1053 A	1171 A	1279 A	383,20
19061	200	4 x 50 x 1	577 A	688 A	786 A	874 A	954 A	191,60
19062	250	5 x 50 x 1	646 A	770 A	880 A	978 A	1068 A	239,50
19063	300	6 x 50 x 1	709 A	844 A	965 A	1073 A	1171 A	287,40
19065	400	8 x 50 x 1	818 A	975 A	1114 A	1238 A	1352 A	383,20
19067	500	10 x 50 x 1	914 A	1089 A	1244 A	1383 A	1510 A	479,00

Remark:

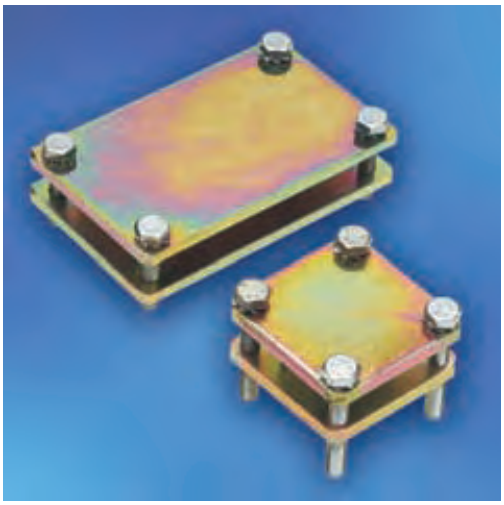
Standard design bare. In special design all dimensions are deliverable with a tin coated surface and in variable lengths (e.g. 3 m). All information about current load are approximate values in consideration of the cables heat for single laying of air cooled cables and ambient temperature +35° C.

The temperature of the conductor is in dependent on the installation, the application, the cooling, the ambient temperature etc., so that if necessary reducing factors are to be considered. With pleasure our employees assist your company in finding optimal solutions.

Bended, twisted and drilled supple bars acc. to your wishes or drawings

Additionally to the delivery of supple bars in standard length of 2 m we deliver bended, twisted and drilled designs acc. to customers' wishes or drawings in large as well as small quantities. If you need more information don't hesitate to contact us. With pleasure our employees assist your company in finding optimal solutions.

Bus- and supple bar connectors



Part-No.	technical data				
	dimensions mm				weight
	compart-ment L x B	outer dimension L x B	screws	torque	kg/%piece
02220	18 x 18	35 x 39	M 6 x 25	6 Nm	11,00
02221	33 x 33	50 x 50	M 6 x 40	6 Nm	22,00
02222	35 x 51	57 x 75	M 6 x 30	6 Nm	29,00
02223	41 x 41	60 x 60	M 6 x 50	6 Nm	32,00
02224	42 x 64	63 x 63	M 6 x 30	6 Nm	36,00
02225	53 x 53	75 x 75	M 6 x 50	6 Nm	50,00
02226	42 x 82	63 x 103	M 6 x 30	6 Nm	45,00
02227	64 x 64	80 x 80	M 6 x 50	6 Nm	54,00
02228	82 x 82	120 x 120	M10 x 50	20 Nm	139,00
02229	102 x 102	140 x 140	M12 x 80	25 Nm	320,00

Remark:
Material zinc coated and chrome plated steel. Suitable to connect busbars between each other as well as busbars with our insulated supple bars. Busbar connectors with other dimensions as in our table are available on request.

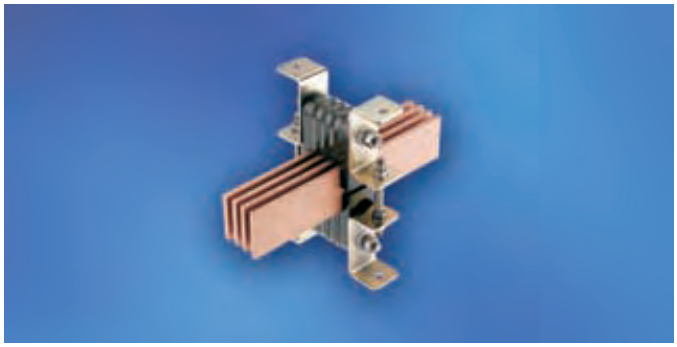
Brace terminals

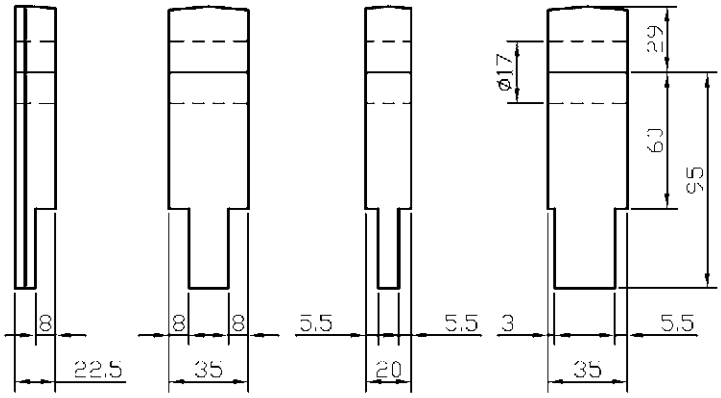
Part-No.	technical data				
			dimensions mm		
	current-load	com-partment B x H	busbar B x H	supple bar B x H	torque
10568	750 A	30 x 25	20 x 5 30 x 10	3 x 20 x 1 bis 10 x 24 x 1	30 Nm
10569	800 A	32 x 25	20 x 5 30 x 10	3 x 20 x 1 bis 10 x 32 x 1	30 Nm
10573	1250 A	41 x 25	30 x 10	5 x 32 x 1 bis	40 Nm
10574			40 x 10	10 x 40 x 1	
10575			50 x 10		
10576			60 x 10		

Remark:
Suitable to connect busbars with our insulated supple bars. The jaw type terminals enable the busbar to be gripped completely and connectors to be connected without drilling. The information about current load is a approximate value under optimized conditions. The relation between conductor cross-section and current load fixed in national or international regulations are not cancelled through our information. Additionally it is necessary to take the values of the current rates of your insulated supple bars into consideration.

Busbar support system
suitable for wall-, ceiling- or base installation

This system enables a simply laying of busbar packages consisting out of small as well as bigger bars. By combining the insulating parts (Part.-No. 15628-15631) with the frame holders, spacing- and tensioning-bolts (Part-Nr. 15632-15635) it is possible to assemble a busbar support system coordinated with the number, the height and the thickness of the bars. The system is suitable for wall-, ceiling- or base installation in vertical as well as in horizontal busbar arrangement. To insulate the tensioning-bolts we deliver the frame holders with an additional insulating disc. To realize a high circuit resistance and an installation with less induction it is necessary to alternate the bars with different potential when working with AC-current. On request we deliver assembled busbar supports in coordination with your application, also with frame holders made out of stainless steel. With pleasure our employees assist your company in finding optimal solutions.

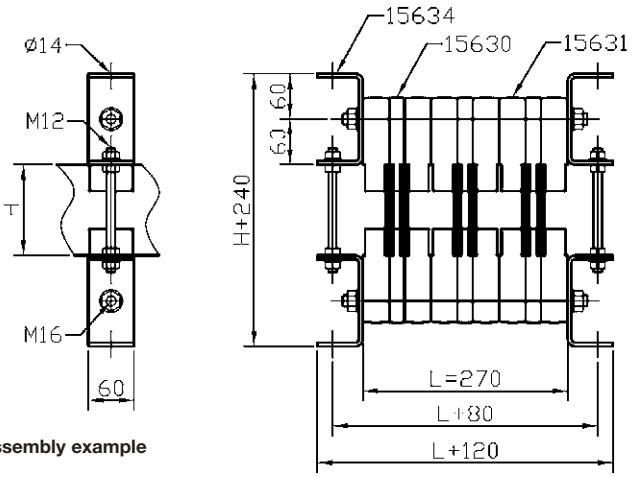




15628 15629 15630 15631

	Part-No.	description
	15628	insulating part 22,5 mm, milling 8 mm on one side
	15629	insulating part 35 mm, milling 8 mm on both sides
	15630	insulating part 20 mm, milling 5,5 mm on both sides
	15631	insulating part 35 mm, milling one side 3 mm and one side 5,5 mm
	15632	tensioning-bolt M16 with nuts and spacers
	15633	spacing-bolt M12 with nuts and spacers
	15634	frame holder with insulating disc
	15635	wall mounting fixing part

Remark:
When placing an order please specify the length of the spacing- and tensioning bolts because they are in dependence of the busbar dimensions and the mounting situation.

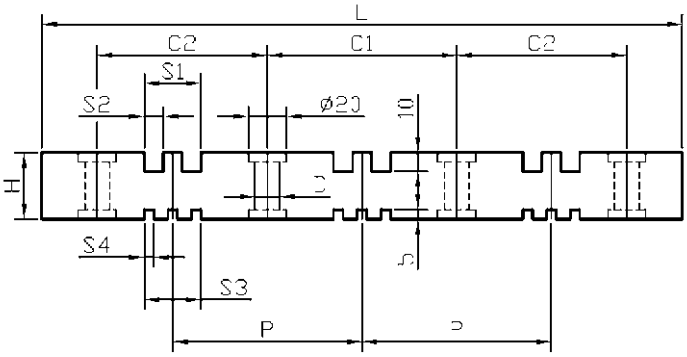


Assembly example

Busbar supports acc. to clients wishes

On request we deliver individual manufactured busbar supports made out of PE-materials like RCH 500/RCH 1000 according to your wishes or drawings. Additionally it is also possible to design and deliver complete fixing systems consisting out of welding-constructions with integrated busbar supports and expansion connectors etc.

Busbar supports



Three-pin busbar supports made out of glass-fibre reinforced unsaturated polyester similar to DIN 16911 type 801. Part-No. 15636 and 15637 = vertical clamping of busbars with a thickness of 5 mm or 10 mm. Part-No. 15638 = As desired horizontal clamping of one busbar with a width of 60 mm or vertical clamping of two busbars with a thickness of 10 mm per phase. The supports are suitable for busbars with a different height. The adjustment of the height can be regulated by the length of the distance bushings Part-No. 15639.

Type testing acc. to VDE 660 part 500 item 7,5
DIN EN 40439 part 1

Part-No.	technical data													
	busbar/phase number x thickness		dimensions mm											weight kg/piece
	S_2	S_4	L	H	B	P	S_1	S_3	S_4	C_1	C_2	D	I	
15636	2 x 10 mm	2 x 5 mm	270	35	35	100	30	18	5	100	-	13	2	0,45
15637	2 x 10 mm	3 x 5 mm	270	35	35	100	32	36	5	100	-	13	2	0,45
15638	2 x 10 mm	1 x 60 mm	370	35	30	125	30	60	60	125	107,5	10	4	0,55
15639	distance bushings in paper laminate													0,20

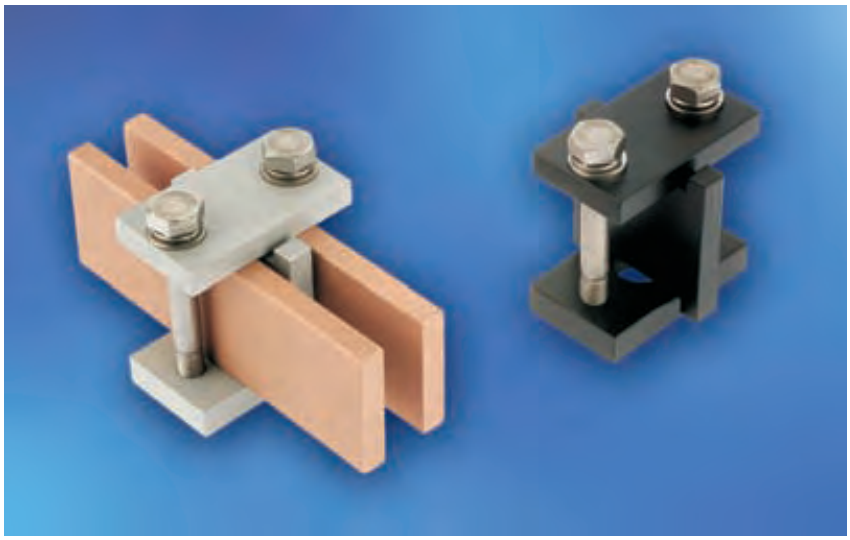
B = width of the supports

I = Number of fixing holes

Calculation list for support distances recommendations for three-pin busbar systems

current-load	E-Cu bars number and dimension	short circuit strength kA							
		35	35	50	50	75	75	100	100
		phase distance mm							
		100	125	100	125	100	125	100	125
		max. support distances mm							
250 A	1 x 20 x 5	250	300						
500 A	2 x 20 x 5	250	300						
630 A	2 x 30 x 5	350	400						
800 A	2 x 40 x 5	450	450	300	300				
1000 A	2 x 50 x 5	500	550	350	400				
1150 A	2 x 60 x 5	550	600	400	450				
1250 A	2 x 40 x 10	950	1000	650	700	450	450	300	350
1500 A	2 x 50 x 10	1100	1200	750	800	500	550	350	400
1700 A	2 x 60 x 10	1200	1300	850	900	550	600	400	450
2100 A	2 x 80 x 10	1400	1500	1000	1050	650	700	500	550
2500 A	2 x100 x 10	1500	1500	1100	1200	750	800	500	600

Busbar holders
for vertical busbar laying
and mounting on insulators

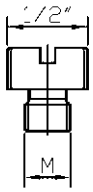


Busbar holders for clamping of one or two short busbars **securely** in the holder.

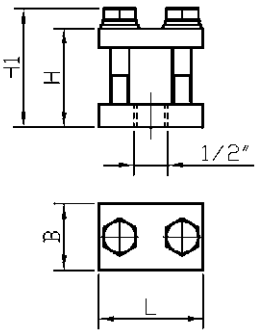
Type A: Suitable for aluminium-bars.
Material of the holder AlMgSi 1,0.
Fastening material stainless-steel.
Type B: Suitable for copper-bars or outdoor installations.
Material of the holder AlMgSi 1,0 with coated surface. Fastening material stainless-steel.

Deliverable threaded reducing-nipples made out of stainless-steel:
Part.-No.

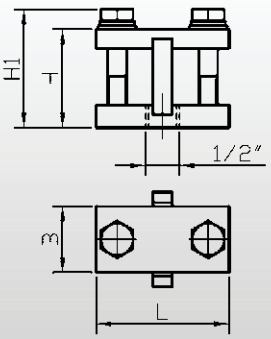
16020	M 8
16021	M 10
16022	M 12
16023	M 16



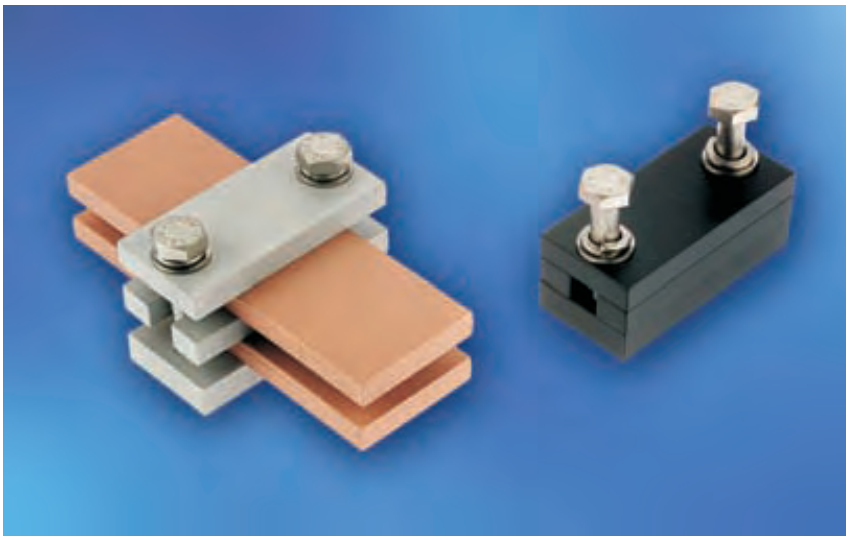
Part-No.		technical data						
		dimensions mm						
type A	type B	number	bar-width	thickness	L	B	H	H_1
15900	**15920**	1	30	3 - 20	55	35	52	63
15901	**15921**	1	40	3 - 20	55	35	62	73
15902	**15922**	1	50	5 - 20	55	40	72	83
15903	**15923**	1	60	5 - 20	55	40	82	93
15904	**15924**	1	80	5 - 20	55	40	107	118
15905	**15925**	1	100	5 - 20	65	50	127	140
15906	**15926**	1	120	5 - 20	65	50	147	160



Part-No.		technical data						
		dimensions mm						
type A	type B	number	bar-width	thickness	L	B	H	H_1
15910	**15930**	2	30	3 - 10	70	35	52	63
15911	**15931**	2	40	3 - 10	70	35	62	73
15912	**15932**	2	50	5 - 10	70	40	72	83
15913	**15933**	2	60	5 - 10	70	40	82	93
15914	**15934**	2	80	5 - 10	70	40	107	118
15915	**15935**	2	100	5 - 10	80	50	127	140
15916	**15936**	2	120	5 - 10	80	50	147	160



Busbar holders
for horizontal busbar laying
and mounting on insulators

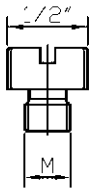


Busbar holders for clamping of one or two short busbars **securely** in the holder.

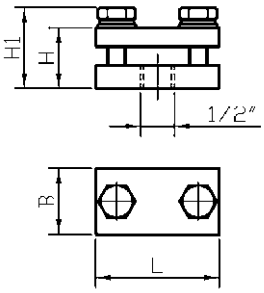
Type A: Suitable for aluminium-bars.
Material of the holder AlMgSi 1,0.
Fastening material stainless-steel.
Type B: Suitable for copper-bars or outdoor installations.
Material of the holder AlMgSi 1,0 with coated surface. Fastening material stainless-steel.

Deliverable threaded reducing-nipples made out of stainless-steel:
Part.-No.

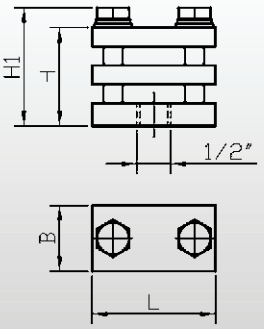
16020	M 8
16021	M 10
16022	M 12
16023	M 16



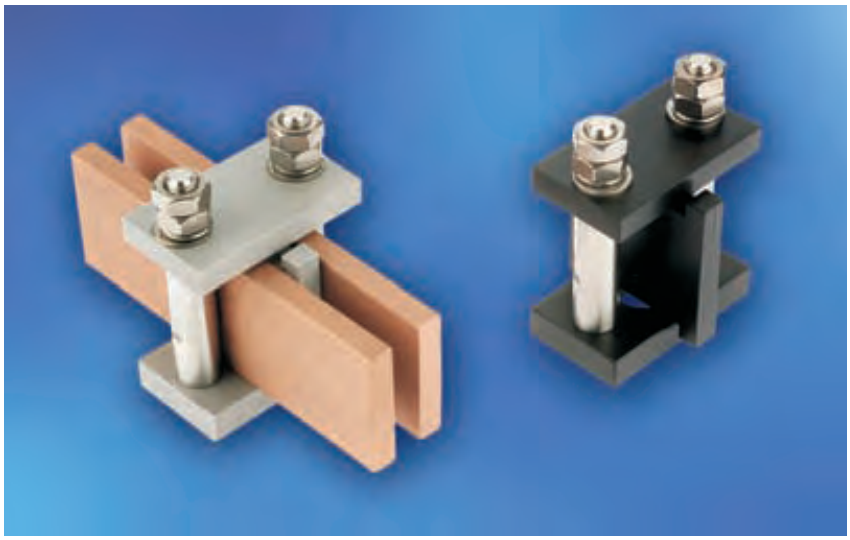
Part-No.		technical data						
		dimensions mm						
type A	type B	number	bar-width	thickness	L	B	H	H_1
15960/5	**15980/5**	1	30	5	65	35	27	38
15960/10	**15980/10**	1	30	10	65	35	32	43
15961/5	**15981/5**	1	40	5	75	35	27	38
15961/10	**15981/10**	1	40	10	75	35	32	43
15962/5	**15982/5**	1	50	5	85	40	27	38
15962/10	**15982/10**	1	50	10	85	40	32	43
15963/5	**15983/5**	1	60	5	95	40	27	38
15963/10	**15983/10**	1	60	10	95	40	32	43
15964/5	**15984/5**	1	80	5	115	40	27	38
15964/10	**15984/10**	1	80	10	115	40	32	43
15965/5	**15985/5**	1	100	5	145	50	35	48
15965/10	**15985/10**	1	100	10	145	50	40	53
15966/10	**15986/10**	1	120	10	165	50	40	53



Part-No.		technical data						
		dimensions mm						
type A	type B	number	bar-width	thickness	L	B	H	H_1
15970/5	**15990/5**	2	30	5	65	35	42	53
15970/10	**15990/10**	2	30	10	65	35	52	63
15971/5	**15991/5**	2	40	5	75	35	42	53
15971/10	**15991/10**	2	40	10	75	35	52	63
15972/5	**15992/5**	2	50	5	85	40	42	53
15972/10	**15992/10**	2	50	10	85	40	52	63
15973/5	**15993/5**	2	60	5	95	40	42	53
15973/10	**15993/10**	2	60	10	95	40	52	63
15974/5	**15994/5**	2	80	5	115	40	42	53
15974/10	**15994/10**	2	80	10	115	40	52	63
15975/5	**15995/5**	2	100	5	145	50	50	63
15975/10	**15995/10**	2	100	10	145	50	60	73
15976/10	**15996/10**	2	120	10	165	50	60	73



Busbar holders
for vertical busbar laying
and mounting on insulators

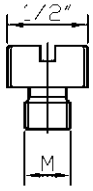


Busbar supports for use as **sliding** support for long busbars which must slide in the holder to allow the thermal expansion. By using this design the lower part of the holder is fastened to the support by means of the stay bolts prior to assembly. Now a simple insertion of the busbars between the stay bolts is possible and a time saving assembly is realized.

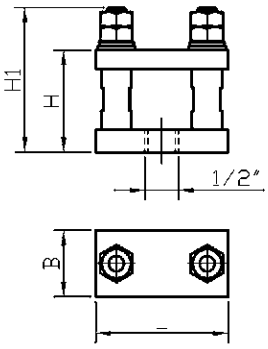
Type A: Suitable for aluminium-bars. Material of the holder AlMgSi 1,0. Fastening material stainless-steel.
Type B: Suitable for copper-bars or outdoor installations. Material of the holder AlMgSi 1,0 with coated surface. Fastening material stainless-steel.

Deliverable threaded reducing-nipples made out of stainless-steel:
Part.-No.

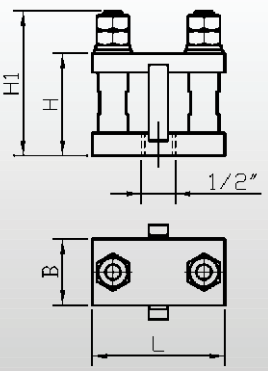
16020 M 8
16021 M 10
16022 M 12
16023 M 16



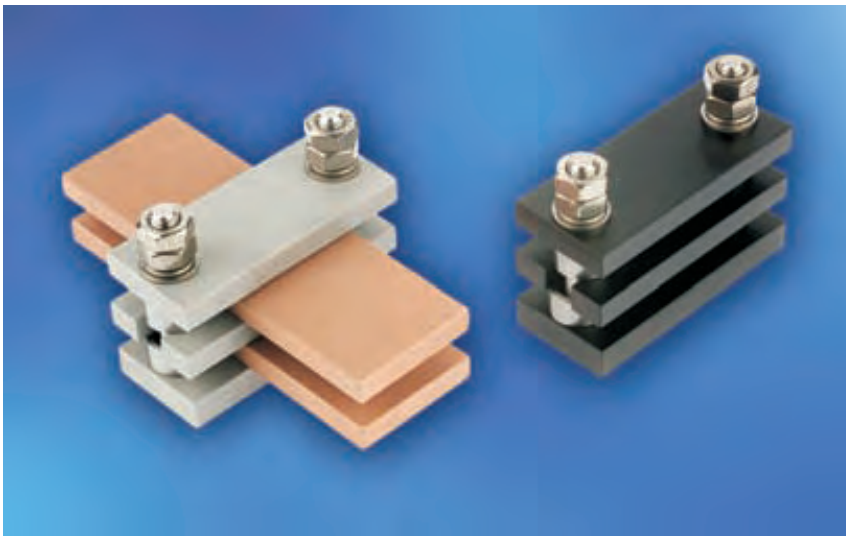
Part-No.		technical data						
		dimensions mm						
type A	type B	number	bar-width	thickness	L	B	H	H_1
16420	**16540**	1	30	3 - 20	70	35	54	77
16421	**16541**	1	40	3 - 20	70	35	64	87
16422	**16542**	1	50	5 - 20	70	40	74	97
16423	**16543**	1	60	5 - 20	70	40	84	107
16424	**16544**	1	80	5 - 20	70	40	109	132
16425	**16545**	1	100	5 - 20	80	50	129	157
16426	**16546**	1	120	5 - 20	80	50	149	177



Part-No.		technical data						
		dimensions mm						
type A	type B	number	bar-width	thickness	L	B	H	H_1
16430	**16550**	2	30	3 - 10	70	35	54	77
16431	**16551**	2	40	3 - 10	70	35	64	87
16432	**16552**	2	50	5 - 10	70	40	74	97
16433	**16553**	2	60	5 - 10	70	40	84	107
16434	**16554**	2	80	5 - 10	70	40	109	132
16435	**16555**	2	100	5 - 10	80	50	129	157
16436	**16556**	2	120	5 - 10	80	50	149	177



Busbar holders
for horizontal busbar laying
and mounting on insulators

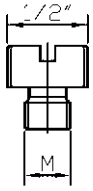


Busbar supports for use as **sliding** support for long busbars which must slide in the holder to allow the thermal expansion. By using this design the lower part of the holder is fastened to the support by means of the stay bolts prior to assembly. Now a simple insertion of the busbars between the stay bolts is possible and a time saving assembly is realized.

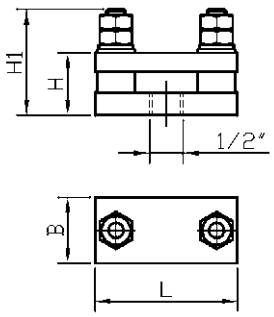
Type A: Suitable for aluminium-bars.
Material of the holder AlMgSi 1,0.
Fastening material stainless-steel.
Type B: Suitable for copper-bars or outdoor installations.
Material of the holder AlMgSi 1,0 with coated surface.
Fastening material stainless-steel.

Deliverable threaded reducing-nipples made out of stainless-steel:
Part.-No.

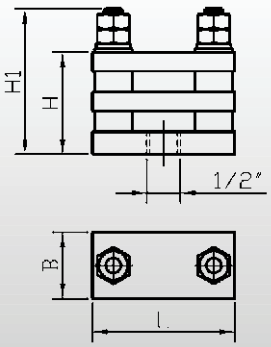
16020	M 8
16021	M 10
16022	M 12
16023	M 16



Part-No.		technical data						
		dimensions mm						
type A	type B	number	bar-width	thickness	L	B	H	H_1
16470/5	**16580/5**	1	30	5	75	35	28	56
16470/10	**16580/10**	1	30	10	75	35	33	56
16471/5	**16581/5**	1	40	5	85	40	28	56
16471/10	**16581/10**	1	40	10	85	40	33	56
16472/5	**16582/5**	1	50	5	95	40	28	56
16472/10	**16582/10**	1	50	10	95	40	33	56
16473/5	**16583/5**	1	60	5	105	40	28	56
16473/10	**16583/10**	1	60	10	105	40	33	56
16474/5	**16584/5**	1	80	5	135	50	36	69
16474/10	**16584/10**	1	80	10	135	50	41	69
16475/5	**16585/5**	1	100	5	155	50	36	69
16475/10	**16585/10**	1	100	10	155	50	41	69
16476/10	**16586/10**	1	120	10	175	50	41	69

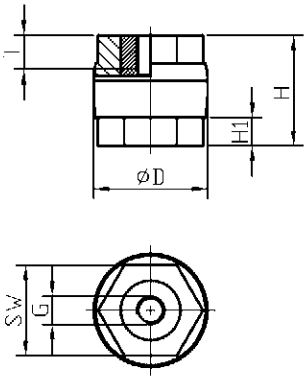


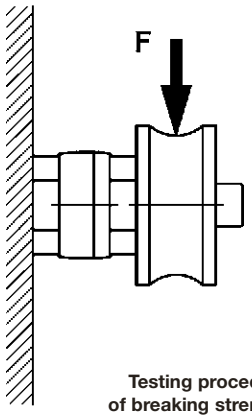
Part-No.		technical data						
		dimensions mm						
type A	type B	number	bar-width	thickness	L	B	H	H_1
16480/5	**16590/5**	2	30	5	75	35	44	77
16480/10	**16590/10**	2	30	10	75	35	54	77
16481/5	**16591/5**	2	40	5	85	40	44	77
16481/10	**16591/10**	2	40	10	85	40	54	77
16482/5	**16592/5**	2	50	5	95	40	44	77
16482/10	**16592/10**	2	50	10	95	40	54	77
16483/5	**16593/5**	2	60	5	105	40	44	77
16483/10	**16593/10**	2	60	10	105	40	54	77
16484/5	**16594/5**	2	80	5	135	50	52	90
16484/10	**16594/10**	2	80	10	135	50	62	90
16485/5	**16595/5**	2	100	5	155	50	52	90
16485/10	**16595/10**	2	100	10	155	50	62	90
16486/10	**16596/10**	2	120	10	175	50	62	90



Insulators
in doubled hexagonal design
with threaded steel inserts (9S 20 K zinc coated)

The supports described here are made of a glass-fibre reinforced unsaturated polyester resin.
The special characteristic is a doubled hexagonal design. So a hexagonal area is fixed at the top as well as at the bottom of the insulator. Therefore it is quick and easy to install or remove the insulators even in confined spaces. This keeps installation costs down to a minimum.





Testing procedure of breaking strength

Part-No.	technical data										
	dimensions mm										weight
	D	H	G	SW	T	H_1	PS kV	BWS kV	F kN	Z kN	kg/% piece
03068 S	30	30	M 6	24	8	9,5	5	0,75	3	6	5,70
03069 S			M 8								5,40
03070 S	30	40	M 6		10	10	5	1,00	4	8	7,30
03071 S	35	30	M 6	30	8	10	5	0,75	4	7	6,50
03072 S			M 8						5	8	6,10
03073 S	40	40	M 8	32	12	10,5	5	1,00	6	11	13,00
03074 S			M10		11						12,10
03075 S			M12		10						11,20
03080 S	40	50	M 8	32	12	10,5	10	1,50	5		16,50
13080 S			M10		15					11	16,50
03081 S			M12		13				7		13,80
13081 S	40	60	M 8	32	12	11	10	1,50	4		16,90
13082 S			M10		15					11	17,60
03078 S	50	40	M10	41	11	13	5	1,00	8		16,50
03079 S			M12		10				10	13	16,50
13083 S	50	50	M12	41	13	13,5	10	1,50	8		20,00
03084 S	50	60	M10		15				6	13	24,10
03085 S			M12		18				7		24,70
13084 S	60	60	M12	50	18	18,5	10	1,50	9	15	32,30
13085 S			M16		17				12	17	32,80

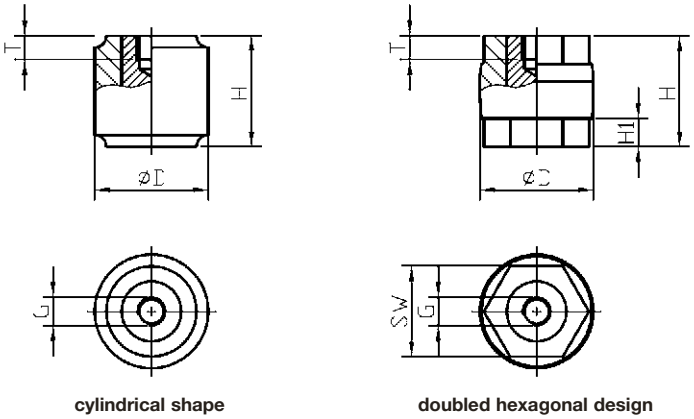
F = Rated load limit on upper support edge
Z = Tensile force
PS = Testing Voltage
BWS = Max. AC operating Voltage

Technical data of the material

Density	DIN 53479	1,75 g/cm³
Flexural Resistance	DIN 53452/ISO R 178	120 N/mm²
Impact Resistance	DIN 53455/ISO R 527	70 N/mm²
Impact Value	DIN 53453/ISO R 179	45 kJ/m²
Long Term/Operational Temperature	VDE 0304, Part 21/IEC 216	+ 130° C
Rod Behaviour	VDE 0304, Part 3	Level BH 2 10
Behaviour in a fire	UL 94	Class V-0
Surface Resistance	DIN 53482	10^{13}
Special Throughout Resistance	DIN 53482	10^{14} . cm
Dielectric Loss Factor	DIN 53483	< 0,02 tan /50 Hz
Deposit Tracking	DIN IEC 112/VDE 0303 Part 1	CT 600
Water Absorption	DIN 53495	< 50 mg/1 d
Colour	-	Brown

The values in the table have been determined with our own standards based on DIN 53451 and combined with the standards for the respective materials for test purposes.

Insulators in cylindrical shape and doubled hexagonal design



cylindrical shape

doubled hexagonal design

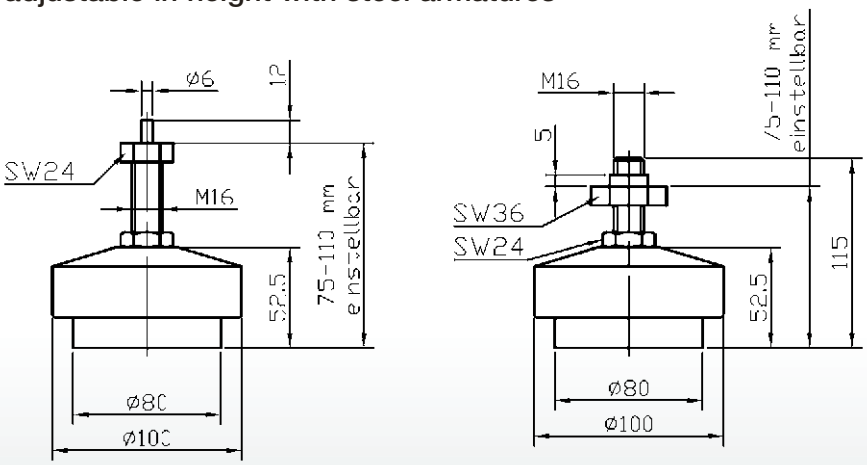
On request we manufacture also designs with grub screws in length acc. to your wishes on one or on both sides of the insulator.

Part-No.	technical data											
		dimensions mm										weight
	design	D	H	G	SW	T	H_1	PS kV	BWS kV	F kN	Z kN	kg/% piece
with steel armatures												
03067*	cylindrical	25	25	M 6	-	7	-	5	0,5	2,5	6	4,20
13079	cylindrical	35	35	M 8	-	7	-	5	0,75	5	7	4,40
13086	cylindrical	80	70	M 16	-	22	-	16	2	14	23	65,00
with brass armatures												
13087*	cylindrical	15	18	M 4	-	5	-	1,5	0,2	1	2	0,50
13088*	cylindrical	20	20	M 5	-	5	-	1,5	0,4	1,5	2,5	1,30
30150	hexagonal	30	30	M 6	24	8	9,5	5	0,75	3	6	5,30
13089	hexagonal	30	30	M 8	24	8	9,5	5	0,75	3	6	5,00
13090	hexagonal	40	40	M 10	32	11	10,5	5	1	6	11	11,20

F = Rated load limit on upper support edge
Z = Tensile force
PS = Testing Voltage
BWS = Max. AC operating Voltage

Remark:
*Material glass-fibre reinforced epoxy resin
instead of glass-fibre reinforced unsaturated polyester.

Insulated feet for tanks adjustable in height with steel armatures



Remark:
Load resistance of the armatures max. 5000 Kp

Part-No.	technical data			
	dimensions mm			
	adjustable height	connec-tion	SW	weight kg/piece
15640	75 - 110	Ø 6	24	0,80
15641	75 - 110	M 16	36	0,95

Heat shrinkable tubing
Material: irradiated cross-linked polyolefin
colour: black

Construction and application

Extremely flexible thin walled heat shrinkable tubing. Flame retardant and self-extinguishing.
Well suited as insulation material for cables, leadings or cable connectors. All tubing are marked with printed UL- and CSA-numbers and therefore well suited for export-orders which require a certificate about the UL/CSA-registration.

Part-No.	technical data						
	before shrinking inside-Ø		after total shrinking		quantity per spool	specification	
	inch	mm	Inside-Ø max. mm	wall-thickness			
30061	3/64	1,2	0,6	0,40	300 m	shrink-ratio:	2:1
30062	1/16	1,6	0,8	0,43	300 m	temperature resistance:	-55° C up to +125° C
30063	3/32	2,4	1,2	0,51	150 m	min. shrink temperature:	+90° C
30064	1/8	3,2	1,6	0,51	150 m	flame retardant/self-extinguishing	
30065	3/16	4,8	2,4	0,51	60 m	dielectric strength:	25 kV/mm
30066	1/4	6,4	3,2	0,64	60 m	tensile strength:	10,3 MPa
30067	3/8	9,5	4,8	0,64	60 m	breaking elasticity	200 %
30068	1/2	12,7	6,4	0,64	60 m	specification:	UL and CSA
30069	3/4	19,1	9,5	0,76	60 m	standard colour:	black, other colours on request
30070	1	25,4	12,7	0,89	60 m		
30072	1 1/2	38,1	19,1	1,02	60 m		
30073	2	50,8	25,4	1,14	60 m		

Heat shrinkable tubing
Material: irradiated cross-linked polyolefin
colour: transparent

Construction and application

Flexible thin walled heat shrinkable tubing with a good mechanical and chemical stability. Don't tear also when shrinking the material about objects with sharp edges. The material offer so multifarious possibilities for application in the industry as well as military field. Suitable for the insulation of busbars, cables, connectors or other power leading parts.

Part-No.	technical data						
	before shrinking inside-Ø		after total shrinking		quantity per spool	specification	
	inch	mm	Inside-Ø max. mm	wall-thickness			
30080	3/64	1,2	0,6	0,40	300 m	shrink-ratio:	2:1
30081	1/16	1,6	0,8	0,43	300 m	temperature resistance:	-55° C up to +135° C
30082	3/32	2,4	1,2	0,51	150 m	min. shrink temperature:	+115° C
30083	1/8	3,2	1,6	0,51	150 m	not self-extinguishing	
30084	3/16	4,8	2,4	0,51	60 m	dielectric strength:	20 kV/mm
30085	1/4	6,4	3,2	0,64	60 m	tensile strength:	10,3 MPa
30086	3/8	9,5	4,8	0,64	60 m	breaking elasticity:	200 %
30087	1/2	12,7	6,4	0,64	60 m	specification:	MIL and VG
30088	3/4	19,1	9,5	0,76	60 m	standard colour:	transparent
30089	1	25,4	12,7	0,89	60 m		
30090	1 1/2	38,1	19,1	1,02	60 m		
30091	2	50,8	25,4	1,14	60 m		
30092	3	76,2	38,1	1,27	60 m		
30093	4	101,6	50,8	1,40	30 m		

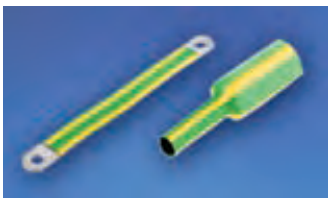
Heat shrinkable tubing
Material: irradiated cross-linked polyolefin
colour: black

Construction and application

Flexible thin walled heat shrinkable tubing with a good mechanical and chemical stability. Don't tear also when shrinking the material about objects with sharp edges. Easy to mark by printing the outside of the tubing. Therefore multifarious applications are given e.g. insulation of busbars, cables, connectors etc.

Part-No.	technical data						
	before shrinking Inside-Ø		after total shrinking		quantity per spool	specification	
	inch	mm	Inside-Ø max. mm	wall-thickness			
30100	3/64	1,2	0,6	0,40	300 m	shrink-ratio:	2:1
30101	1/16	1,6	0,8	0,43	300 m	temperature resistance:	-55° C up to +135° C
30102	3/32	2,4	1,2	0,51	150 m	min. shrink temperature:	+90° C
30103	1/8	3,2	1,6	0,51	150 m	flame retardant/self-extinguishing	
30104	3/16	4,8	2,4	0,51	60 m	dielectric strength:	20 kV/mm
30105	1/4	6,4	3,2	0,64	60 m	tensile strength:	10,3 MPa
30106	3/8	9,5	4,8	0,64	60 m	breaking elasticity:	200 %
30107	1/2	12,7	6,4	0,64	60 m	specification:	MIL and UL
30108	3/4	19,1	9,5	0,76	60 m	standard colour:	black, other colours on request
30109	1	25,4	12,7	0,89	60 m		
30110	1 1/2	38,1	19,1	1,02	60 m		
30111	2	50,8	25,4	1,14	60 m		
30112	3	76,2	38,1	1,27	60 m		
30113	4	101,6	50,8	1,40	30 m		

Heat shrinkable tubing for earthing applications
Material: irradiated cross-linked polyolefin
Colour: yellow/green



Construction and application

Flexible thin walled heat shrinkable tubing, flame retardant and self-extinguishing. Well suited for a marking of earthing connections. Caused by the special production process (dual-colour-extrusion) it is guaranteed that the material either doesn't fade nor it is possible to rub off the colour.

Part-No.	technical data						
	before shrinking Inside-Ø		after total shrinking		quantity per spool	specification	
	inch	mm	Inside-Ø max. mm	wall-thickness			
30182	3/64	1,2	0,6	0,41	300 m	shrink-ratio:	2:1
30183	1/16	1,6	0,8	0,43	300 m	temperature resistance:	-55° C up to +135° C
30184	3/32	2,4	1,2	0,51	150 m	min. shrink temperature:	+90° C
30185	1/8	3,2	1,6	0,69	150 m	flame retardant/self-extinguishing	
30186	3/16	4,8	2,4	0,84	60 m	dielectric strength:	20 kV/mm
30187	1/4	6,4	3,2	0,90	60 m	tensile strength:	10,3 MPa
30188	3/8	9,5	4,8	1,00	60 m	breaking elasticity:	100 %
30189	1/2	12,7	6,4	1,20	60 m	specification:	MIL and UL
30190	3/4	19,1	9,5	1,40	60 m	standard colour:	yellow/green
30191	1	25,4	12,7	1,80	60 m		
30192	1 1/2	38,1	19,1	2,40	60 m		
30193	2	50,8	25,4	2,40	60 m		

Heat shrinkable tubing
Material: irradiated cross-linked polyolefin
colour: black

Construction and application

Flexible thin walled heat shrinkable tubing with high shrink-ratio (4:1) and less longitudinal change (max. 5 %). Well suited for repair works, because only 5 dimensions are needed to cover a wide diameter range.
Delivery in cut length of 0,9/1,2 m.

Part-No.	technical data						
	before shrinking inside-Ø		after total shrinking		cut-length		
	inch	mm	inside-Ø max. mm	wall-thickness		specification	
13060	1	25,4	6,6	1,52	1,2 m	shrink-ratio:	4:1
13061	1 1/2	38,1	9,5	1,52	1,2 m	temperature resistance:	-55° C up to +135° C
13062	2	50,8	12,7	1,52	1,2 m	min. shrink temperature:	+90° C
13063	3	76,2	19,1	1,52	0,9 m	flame retardant/self-extinguishing	
13064	4	101,6	25,4	1,52	0,9 m	dielectric strength:	20 kV/mm
						tensile strength:	10,3 MPa
						breaking elasticity:	200 %
						specification:	MIL and UL
						standard colour:	black

Heat shrinkable tubing
Material: irradiated cross-linked polyolefin
with and without adhesive, colour: black

Construction and application

Flexible medium walled heat shrinkable tubing as desired with or without adhesive. Well suited for protecting and insulating of components inside of low voltage or outdoor applications. The adhesive melts when shrinking the tube, so that the components are protected against moisture.
Delivery in cut length of 1,2 m.
Type A: without glue inside, **Type B:** with glue inside

Part-No.		technical data					
		Inside-Ø before shrinking	after total shrinking		cut-length		
type A	type B	mm	inside-Ø max. mm	wall-thickness		specification	
13066	**13068**	10,2	3,8	1,5	1,2 m	shrink-ratio:	3:1
30122	**15821**	19,0	5,6	2,0	1,2 m	temperature resistance:	-55° C up to +125° C
15803	**15823**	28,0	9,5	2,0	1,2 m	min. shrink temperature:	+120° C
15804	**13069**	33,0	10,2	2,0	1,2 m	not self-extinguishing	
30128	**15824**	38,1	12,7	2,3	1,2 m	dielectric strength:	20 kV/mm
30129	**15825**	44,0	14,0	2,3	1,2 m	tensile strength:	14 MPa
15806	**15826**	52,1	18,2	2,3	1,2 m	breaking elasticity:	300 %
15808	**15828**	70,0	25,5	2,3	1,2 m	specification:	-
15809	**15829**	90,0	30,0	2,5	1,2 m	standard colour:	black

Dual wall heat shrinkable tubing with adhesive colour: black

Construction and application

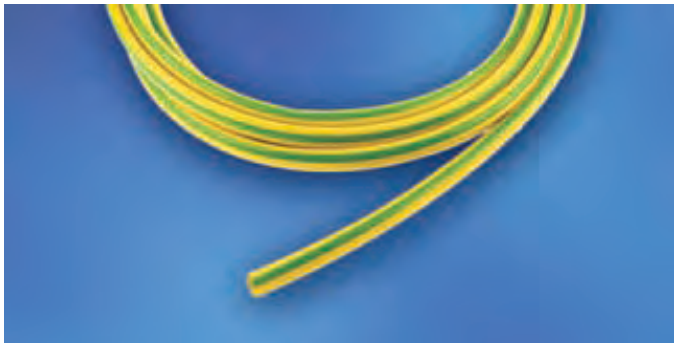
Flexible dual wall heat shrinkable tubing. Material of the outer wall polyolefin and polyamide for the inner wall. The adhesive melts when shrinking the tube, so that components are protected against moisture. Delivery in cut length of 1,2 m.

Part-No.	technical data					
	inside-Ø before shrinking mm	after total shrinking inside-Ø max. mm	after total shrinking wall-thickness	cut-length	specification	
30195	3	1,0	1,00	1,2 m	shrink-ratio:	3:1
30196	4,5	1,5	1,00	1,2 m	temperature resistance:	-55° C up to +110° C
30197	6	2,0	1,00	1,2 m	min. shrink temperature:	+120° C
30198	9	3,0	1,40	1,2 m	flame retardant/self-extinguishing	
30199	12	4,0	1,75	1,2 m	dielectric strength:	20 kV/mm
30200	19	6,0	2,25	1,2 m	tensile strength:	16 MPa
30201	24	8,0	2,50	1,2 m	breaking elasticity:	450 %
					specification:	UL and MIL
					standard colour:	black

PVC insulating tubing colour: grey temperature resistance: -20° C up to +90° C

Part-No.	technical data			Part-No.	technical data		
	inside-Ø	dimensions mm wall-thickness ca.	length of the rolls		inside-Ø	dimensions mm wall-thickness ca.	length of the rolls
54140	5	0,6	200 m	**54190**	35	1,0	25 m
54142	6	0,6	200 m	**54192**	40	1,0	25 m
54144	7	0,7	200 m	**54194**	45	1,0	25 m
54146	8	0,7	200 m	**54195**	50	1,0	25 m
54148	9	0,7	200 m	**54196**	55	1,0	25 m
54150	10	0,7	100 m	**54198**	60	1,0	25 m
54154	12	0,8	100 m	**54199**	65	1,0	25 m
54158	14	1,0	100 m	**54200**	70	1,0	25 m
54162	16	1,0	100 m	**54202**	75	1,0	25 m
54164	18	1,0	100 m	**54204**	80	1,0	25 m
54166	22	1,2	50 m	**54206**	85	1,0	25 m
54172	24	1,2	50 m	**54208**	90	1,0	25 m
54176	26	1,2	50 m	**54210**	95	1,0	25 m
54178	28	1,2	50 m	**54211**	100	1,0	25 m
54182	30	1,0	25 m				

PVC insulating tubing
colour: yellow/green
temperature resistance: -20° C up to -90° C



Part-No.	technical data			Part-No.	technical data		
	inside-Ø max. mm	dimensions mm wall-thickness ca.	length of the rolls		inside-Ø max. mm	dimensions mm wall-thickness ca.	length of the rolls
13095	2	0,4	50 m	**13100**	12	0,8	25 m
13096	4	0,5	50 m	**13101**	14	0,8	25 m
13097	6	0,6	25 m	**13118**	16	0,8	25 m
13098	8	0,6	25 m	**13119**	20	0,8	25 m
13099	10	0,7	25 m				

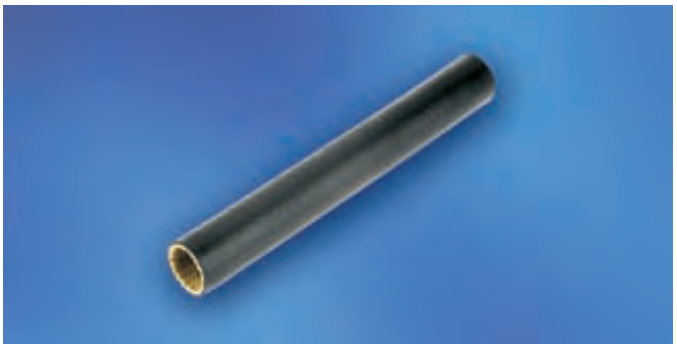
Silicone insulating tubing
nature colour
temperature resistance: -50° C up to +180° C

Part-No.	technical data			Part-No.	technical data		
	inside-Ø max. mm	dimensions mm wall-thickness ca.	length of the rolls		inside-Ø max. mm	dimensions mm wall-thickness ca.	length of the rolls
15890	2	0,4	100 m	**13106**	24	1,0	25 m
15891	3	0,4	100 m	**13107**	26	1,0	25 m
15892	4	0,5	100 m	**13108**	28	1,0	25 m
15893	5	0,6	100 m	**13109**	30	1,0	25 m
15894	6	0,6	100 m	**13110**	35	1,0	25 m
15895	7	0,7	100 m	**13111**	40	1,0	25 m
15896	8	0,7	50 m	**13112**	45	1,0	25 m
15897	10	0,7	50 m	**13113**	50	1,0	25 m
15898	12	0,8	50 m	**13114**	55	1,0	25 m
13102	14	0,8	25 m	**13115**	60	1,0	25 m
13103	18	1,0	25 m	**13116**	65	1,0	25 m
13104	20	1,0	25 m	**13117**	70	1,0	25 m
13105	22	1,0	25 m				

Fire protection hoses

Construction and application

Our fire protection hoses consist of an inner sleeve fabricated out of texturised and twined calcium-silicate yarns with an outer silicone cover. Caused by the thermical stability the material is well suited to protect cables and leadings as well as hydraulic- or cooling water hoses inside of steel industrial plants, foundries or glass manufacturing plants. The hoses in the diameter range of 75 mm up to 200 mm are mainly used as additional protection hose for water cooled high current cables inside of electric arc- or ladle furnaces. They protect such parts of the cables, needing an additional thermal protection against radiated heat or liquid metal splashing and guarantee an extended lifetime of such cables. The colour in the diameter range up to 60 mm is grey and from 75 mm up to 200 mm red. Please notice that we also deliver ready assembled high current cables directly equipped with fire protection hoses acc. to the description on catalogue page 36.



Technical data

Construction

- Special fire protection hose with an inner sleeve fabricated out of texturised and twined calcium-silicate yarns and outer silicone cover in a grey coloured design respectively with a heat resistant, non inflammable inlay and outer silicone cover in red coloured design.

Inner sleeve

- non inflammable
- temperature resistance >+700° C

Silicone cover

- hardly inflammable, self-extinguishing
- temperature resistance
  continuously up to circa +300° C
  shortly up to circa +500° C

Part-No.	technical data		Part-No.	technical data	
	dimensions			dimensions	
colour grey	inside-Ø mm	length of the rolls	colour red	inside-Ø mm	length of the rolls
15831	10	25	**15847**	75	15
15832	15	25	**15848**	100	15
15833	20	25	**15849**	125	15
15834	22	25	**15850**	160	20
15835	25	25	**15851**	170	20
15836	28	25	**15852**	180	10
15837	30	25	**15853**	200	20
15838	32	25			
15839	35	25			
15840	40	25			
15841	50	25			
15842	60	25			

Fire protection sleeving for high current cables made out of therm textile

Additionally to the delivery of our standardized fire protection hoses it is possible to protect cables and leadings against radiated heat and liquid metal splashing with products made out of therm textile.

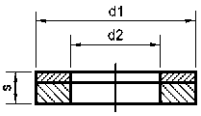
This material is in accordance with DIN 4102 A1 non inflammable, free of asbestos and toxicologically harmless. The materials have a continuously temperature resistance up to +700° C and offer good insulating properties.
It is fabricated out of texturised yarns without organic components. The products are finished by sewing the material to a sleeve with or without snap fastener system. So it is possible to fix the material exactly to the dimension of the existed and to protected cables. The snap fastener system offers an afterward protection of the cables as well as a changing of cables under the condition to reuse the heat protection material.
We deliver fire protection materials and special components coordinated with your application. With pleasure our employees assist your efforts in finding optimal solutions.

Bimetallic sheets

Bimetallic elements consist of copper plated aluminium plates. Since the connection area of both metals is in the middle, it is kept away from air and humidity.
This material enables a secure contact and a corrosion protected connection between copper and aluminium. Besides bimetallic plates and spacers we can also supply cut-outs with and without drill holes especially for your specific application.

Part-No..	technical data			
	dimensions mm			weight
	length	width	thickness	kg/sheet
02670	2000	500	1	4,70
02671			1,5	7,00
02672			2	9,35
02673	2000	600	3	16,80

Bimetallic washers



Part-No.	technical data				
	dimensions mm				
	for drill hole				weight
	M	d_1	d_2	S	kg/%piece
13295	3	8	3,5	1	0,02
13296	4	10	4,5	1	0,03
13297	5	12	5,5	1	0,05
02675	6	15	6,5	1	0,07
02676	8	18	8,5	1	0,09
02677	10	22	10,5	1,5	0,18
02678	12	25	13	2	0,68
02679	12	28	13	2	0,44
02680	16	35	17	2	0,66

Seal-contact-modules for high current transmission

Seal-contacts are constructed for high current transmission with busbars and plates (copper/copper, Alu/copper or Alu/Alu) in indoor as well as outdoor-installations.
It is possible to connect unplated, unmachined and uncleaned busbars or plates also in corrosive atmospheres (e.g. sulphur dioxide, salt laden air, chlorine etc.). The modules are suitable for bolted joints in busbars according to DIN. By using these elements the high current transmission is made in hermetically sealed chambers, so that no oxidation or corrosion is possible. So you get low loss over a long time of use. The torsion spinglouver of the multilam permits the contact force as well as the electrical performance of the busbar joint to remain constant even when the compression force drops to 50 % of its initial value. The torsion spinglouver of the multilam get through the oxydlayer of the busbar, so that a cleaning or coating of the contact areas is not necessary. So screw connections with low loss and without any servicing over a long time of use are guaranteed.

Part-No.	technical data			
	dimensions mm			
	description	length	width	thickness
02696	contact module	40	13,33	1,4
02697	support modul long	40	13,33	1,4
02698	support modul short	13,33	13,33	1,4

Remark:
Continuous operating temperature up to +100° C,
short circuit current 1 s = 20 kA.

Selecting and safety instructions by using our flexible and highly flexible braids, leadings, cables and ready assembled components

General advice

The measurements and technical information written in this catalogue have been determined with greatest care and are updated continuously in our documentation. We reserve us the right to make technical as well as changes of measurements, colours or formats after print. **Our information especially the values for possible current-loads are not binding, they are only approximate values under optimized conditions. The relation between conductor cross-section and current-load fixed in national or international regulations are not cancelled through our information.** Also it is necessary to pay attention to the following facts. Only the values in our written order confirmations are binding for us.

Demands to current transfer elements

All components for current transfer must be selected under the condition that by using the components in accordance with the regulations or requirements no unacceptable risk are created for life and health of persons as well as a damaging of objects. To guarantee these demands it is absolutely necessary to check and analyse possible risks, source of errors and rest risks even when planning or designing plants or products. All components for current transfer must be so calculated that they are sufficient dimensioned for all possible load (current as well as voltage) which can be occurred inside of the planed application. Particularly by existing limit conditions it is necessary to take the values of the current rates or voltages fixed in national or international regulations into consideration.

Values of influence

Following some short examinations of the fundamental facts, which have an influence of the construction of current transfer components.
Please notice that it is important to consider and observe all facts together and not separately.

Selecting information

The fundamental facts for selecting the right current transfer components are the operating conditions and the outer influences. Operating conditions are the height of voltage and current, kinds of laying, the number of leadings or cables, the cooling possibilities, the safety devices etc. Outer influences are the ambient temperature, the existence of corrosive or other chemical substances, mechanical stress or special requirements concerning of the installation situation, the existence and influence of steam, moisture or radiation (e. g. sunlight). All these facts must be taken into account when constructing or designing solutions for current transfer applications.

Voltage

It is necessary to protect and insulate the flexible leadings and current transfer components in coordination with the existing voltage of the application.
The operation voltage of leadings or cables is defined in Volt by the values U_0/U. It is the voltage which determines the construction and the electrical test procedures of the leadings. Here is

U_0 = Value of the permissible voltage between an external conductor and earth
U = Value of the permissible voltage between two external conductors of multicore or a system of single core leadings

According to the regulations of the VDE 0298 part 3 the operating voltage of the leadings must be identical with the operating voltage of the whole system, when working with AC-voltage. This regulation is binding for the value U_0 as well as for the value U. When working in a system with DC-voltage it is acc. to the VDE allowed to calculate with a maximum value of one and a half of the operating voltage of the leadings. But we recommend to exceed the value not more than 10 % continuously.

Current load

The cross-section of a conductor should be so selected that its allowed current load and the permissible maximum continuous current load of the application should be identical or greater. Additionally you have to take the permissible heat resistance of the used insulation material and the possible voltage drops into your account. Some fundamental facts which have influence of the dimensioning of electrical conductors are therefore:

- Kind of laying and number of the conductors
- Voltage drop and electrical losses
- Ambient temperature
- Insulation material and thermal stress
- Cooling possibilities
- Frequency of the current (when > 50 Hz)
- Consequences of electrical waves etc.

Such influences must be compensated by the consideration of necessary reducing factors. Additionally all thermical influences must be taken into account, so that it is not possible to hinder a thermical radiation and a danger of fire is excluded.

Mechanical stress

Also it is necessary to calculate the risks of a possible mechanical stress. Fundamental values can be created by a tensile-, pressure-, torsion- and bending stress or other facts created by the handling, transport or installation. Electrical elements which are particularly subjects of mechanical stress or flexible components which have to realize movements must be selected very carefully and well suited to the application. With pleasure our employees assist your efforts in finding optimized solutions.

Coordination of components to the different applications

When selecting flexible leadings, cables or components it is necessary to pay attention to the application, the installation, the ambient conditions and to all risks arising out of these facts. So a consideration of the following facts is important too:

- Avoidance of a possible mechanical or electrical influence between bordered power systems
- Thermical radiation as well as chemical or physical influences of the conductor, the insulation or other bordered materials
- Examination of possible influences or reactions between bordered materials and the conductor with his insulation
- Examination of the fixing and the fixing materials concerning possible damages e.g. caused by the dynamic strength in case of short circuit situations.

Table of the current-load for non insulated copper braids or round stranded copper cables

technical information							
cross-section mm²	current-load	cross-section mm²	current-load	cross-section mm²	current-load	cross-section mm²	current-load
1	18 A	10	85 A	95	360 A	400	950 A
1,5	21 A	16	120 A	120	420 A	500	1100 A
2,5	30 A	25	150 A	150	480 A	625	1300 A
4	40 A	35	195 A	185	570 A	750	1450 A
6	55 A	50	250 A	240	670 A	850	1550 A
8	70 A	70	300 A	300	780 A	1000	1800 A

Remark:
All information about current-load are approximate values in consideration of the cables heat for single laying of air cooled cables and ambient temperature +35° C and a conductor heat of circa +70° C. The temperature of the conductor is in dependant on the ambient temperature, the installation, the cooling etc. so that our information only approximate values under optimized conditions.

Conversion table for usual US-American and British units of measurement

AWG-No.	30	29	28	27	26	25	24	23	22	21	20	19
cross-section mm²	0,0503	0,0646	0,0804	0,0102	0,128	0,163	0,205	0,259	0,325	0,412	0,519	0,653
comparable metric cross-section mm²	0,05	-	-	0,1	0,14	-	0,2	0,25	-	-	0,5	-

AWG-No.	18	17	16	15	14	13	12	11	10	9	8	7
cross-section mm²	0,823	1,04	1,31	1,65	2,08	2,63	3,31	4,15	5,27	6,62	8,35	10,6
comparable metric cross-section mm²	0,75	1	-	1,5	-	2,5	-	-	-	6	-	10

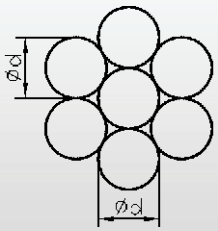
AWG-No.	6	5	4	3	2	1	0	2/0	3/0	4/0	
cross-section mm²	13,3	16,8	21,2	26,7	33,6	42,4	53,4	67,5	85,0	107,2	
comparable metric cross-section mm²	-	16	-	25	35	-	50	70	95	120	

AWG-No./MCM	250	300	350	400	500	600	750	1000		
cross-section mm²	127	152	178	203	254	304	380	507		
comparable metric cross-section mm²	120	150	185	200	240	300	400	500		

Remark:
The units of measurement in the United States are written in AWG-No. (AWG = American Wire Gauge).
These numbers are identical with the British B&S-No. (BS = Brown & Sharp). The units of measurement for the bigger conductor cross-sections are made in MCM (circular Mils). 1 MCM = 1000 circ. Mils = 0,5067 mm².

Formula for the identification of the conductor cross-section of flexible braids, leadings and cables

$$F = \frac{d^2 \times}{4} \times n$$



F = conductor cross-section in mm²
d = diameter of the wire
= 3,14
n = number of the wires

Comparison table of the new material indications acc. to DIN EN 13599 and following no. to the older indications to DIN 1751/1791 resp. DIN 40500

material indication			
DIN EN 13599 - 13602		DIN 1751: 1973 - 06, DIN 1791: 1973 - 06, DIN 40500: 1980 - 04[a]	
symbol	material-number	symbol	material-number
Cu-ETP1	CW003A	-	-
Cu-ETP	CW004A	E-Cu58	2.0065
Cu-FRHC	CW005A	E-Cu58	2.0065
Cu-OF	CW008A	OF-Cu	2.0040
CuAg0,10	CW013A	CuAg0,1	2.1203
CuAg0,10P	CW016A	CuAg0,1P	2.1191
CuAg0,10(OF)	CW019A	-	-
Cu-PHC	CW020A	SE-Cu[b]	2.0070[b]
Cu-HCP	CW021A	SE-Cu[c]	2.0070[c]

[a] With regard to the non listed materials in our table, contained in the older norms take a look at DIN EN 1652:1998-03. An overall view about materials and products is contained in DIN V 17900:1999-03.

[b] If the conductivity is min 58 m/ x m^2 and the contend of copper has a min. value of 99,95 % by using of P for deoxidation.

[c] If the contend of copper has a min. value of 99,95 % by using P for deoxidation.

Table for the weight of copper busbars

width	weight per meter in kg/thickness mm									
mm	2	3	4	5	6	8	10	15	20	25
10	0,180	0,270	0,360	0,450	0,540	0,720	0,890	-	-	-
12	0,220	0,320	0,430	0,540	0,640	0,860	1,070	-	-	-
14	0,250	0,380	0,500	0,630	0,750	1,000	1,250	-	-	-
15	0,270	0,400	0,540	0,670	0,810	1,070	1,340	2,020	-	-
20	0,360	0,540	0,720	0,890	1,070	1,430	1,780	2,700	3,600	-
25	0,450	0,670	0,890	1,120	1,340	1,780	2,230	3,370	4,500	5,560
30	0,540	0,800	1,070	1,330	1,610	2,140	2,670	4,050	5,400	6,700
35	0,630	0,930	1,250	1,560	1,870	2,500	3,120	4,720	6,300	7,850
40	0,710	1,070	1,430	1,780	2,140	2,850	3,560	5,400	7,200	8,960
45	0.800	1,200	1,610	2,000	2,410	3,210	4,000	6,080	8,100	10,090
50	0.890	1,340	1,780	2,220	2,670	3,560	4,450	6,750	9,000	11,200
60	1,070	1,600	2,140	2,670	3,210	4,280	5,340	8,100	10,800	13,500
70	1,250	1,870	2,500	3,110	3,740	4,980	6,230	9,450	12,600	15,700
80	1,430	2,140	2,850	3,560	4,280	5,690	7,120	10,800	14,400	17,920
90	1,600	2,410	3,210	4,000	4,810	6,400	8,010	12,150	16,200	20,160
100	1,780	2,670	3,560	4,450	5,340	7,190	8,900	13,500	18,000	22,300
110	1,960	2,940	3,920	4,900	5,880	7,840	9,800	14,850	19,800	24,640
120	2,130	3,200	4,270	5,240	6,400	8,550	10,680	16,200	21,600	26,900
130	2,310	3,490	4,630	5,780	6,940	9,250	11,570	17,550	23,400	29,920
140	2,490	3,740	4,980	6,220	7,470	9,960	12,460	18,900	25,200	31,360
150	2,670	4,000	5,340	6,670	8,010	10,460	13,350	20,250	27,000	33,600
160	2,850	4,270	5,700	7,120	8,550	11,740	14,400	21,600	28,800	35,800
200	3,560	5,240	7,120	8,900	10,640	14,380	17,800	27,000	36,000	44,800

Table for the current load of copper busbars acc. to DIN 43671

width x thickness mm	material	continous current in A															
		AC up to 60 Hz								DC/AC up to 16 2/3 Hz							
		coated				uncoated				coated				uncoated			
		number of busbars				number of busbars				number of busbars				number of busbars			
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
		I	II	III		I	II	III		I	II	III	IIII	I	II	III	IIII
12 x 2		123	202	228		108	182	216		123	202	233		108	182	220	
15 x 2		148	240	261		128	212	247		148	240	267		128	212	252	
15 x 3		187	316	381		162	282	361		187	316	387		162	282	365	
20 x 2		189	302	313		162	264	298		189	302	321		162	266	303	
20 x 3		237	394	454		204	348	431		237	394	463		204	348	437	
20 x 5		319	560	728		274	500	690		320	562	729		274	502	687	
20 x 10		497	924	1320		427	825	1180		499	932	1300		428	832	1210	
25 x 3		287	470	525		245	412	498		287	470	536		245	414	506	
25 x 5		384	662	869		327	586	795		384	664	841		327	590	794	
30 x 3		337	544	593		285	476	564		337	546	608		286	478	575	
30 x 5		447	760	944		379	672	896		448	766	950		380	676	897	
30 x 10	E-Cu F30/	676	1200	1670		573	1060	1480		683	1230	1630		579	1080	1520	
40 x 3	Cu-ETP	435	692	725		366	600	690		436	696	748		367	604	708	
40 x 5	4/4 hard	573	952	1140		482	836	1090		576	966	1160		484	848	1100	
40 x 10		850	1470	2000	2580	715	1290	1770	2280	865	1530	2000		728	1350	1880	
50 x 5		697	1140	1330	2010	583	994	1260	1920	703	1170	1370		588	1020	1300	
50 x 10		1020	1720	2320	2950	852	1510	2040	2600	1050	1830	2360		875	1610	2220	
60 x 5		826	1330	1510	2310	688	1150	1440	2210	836	1370	1580	2060	696	1190	1500	1970
60 x 10		1180	1960	2610	3290	985	1720	2300	2900	1230	2130	2720	3580	1020	1870	2570	3390
80 x 5		1070	1680	1830	2830	885	1450	1750	2720	1090	1770	1990	2570	902	1530	1890	2460
80 x 10		1500	2410	3170	3930	1240	2110	2790	3450	1590	2730	3420	4490	1310	2380	3240	4280
100 x 5		1300	2010	2150	3300	1080	1730	2050	3190	1340	2160	2380	3080	1110	1810	2270	2960
100 x 10		1810	2850	3720	4530	1490	2480	3260	3980	1940	3310	4100	5310	1600	2890	3900	5150
120 x 10		2110	3280	4270	5130	1740	2860	3740	4500	2300	3900	4780	6260	1890	3390	4560	6010
160 x 10		2700	4130	5360	6320	2220	3590	4680	5530	3010	5060	6130	8010	2470	4400	5860	7110
200 x 10		3290	4970	6430	7490	2690	4310	5610	6540	3720	6220	7460	9730	3040	5390	7150	9390

Remark:
Continuous currents for busbars Cu-ETP/E-Cu according to the DIN regulations for rectangular bars in interior systems at +35° C air temperature and + 65° C bar temperature and vertical bar position, bar packages with spaces like the bar thickness respectively minimum 50 mm by laying of 4 busbars or when working with AC-current with a main distance of > 0,8 x main conductor distance (measured middle to middle of the bars). Values for a changed ambient temperature and reducing factors for changed applications are contained in the DIN 43671.

Material indications for copper busbars

indication		tensile strength min. N/mm²	conductivity by +20° C in Siemens	specific resistance by +20° C $\frac{\text{x mm}^2}{\text{m}}$	density kg/dm³
E-Cu F20	Cu-ETP soft	200	57	0,01754	8,9
E-Cu F25	Cu-ETP med.hard	250	56	0,01786	8,9
E-Cu F30	Cu-ETP 4/4 hard	300	56	0,01786	8,9
E-Cu F37	Cu-ETP very hard	360	55	0,01818	8,9

Table for the current load of aluminium busbars acc. to DIN 43670

width x thickness mm	material	continous current in A															
		AC up to 60 Hz								DC/AC up to 16 2/3 Hz							
		coated				uncoated				coated				uncoated			
		number of busbars				number of busbars				number of busbars				number of busbars			
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
		I	II	III	II II (50)	I	II	III	II II (50)	I	II	III	IIII	I	II	III	IIII
12 x 2	E-Al F13	97	160	178		84	142	168		97	160	183		84	142	171	
15 x 2		118	190	204		100	166	193		118	190	210		100	166	197	
15 x 3		148	252	300		126	222	283		148	252	305		126	222	286	
20 x 2		150	240	245		127	206	232		150	240	252		127	206	237	
20 x 3		188	312	357		159	272	337		188	312	364		159	272	342	
20 x 5		254	446	570		214	392	537		254	446	576		214	392	539	
20 x 10		393	730	1060		331	643	942		393	733	1020		331	646	943	
25 x 3		228	372	412		190	322	390		228	372	422		191	322	396	
25 x 5		305	526	656		255	460	619		305	528	663		255	460	622	
30 x 3		267	432	465		222	372	441		268	432	477		222	372	449	
30 x 5		356	606	739		295	526	699		356	608	749		296	528	703	
30 x 10		536	956	1340		445	832	1200		538	964	1280		447	839	1180	
40 x 3	E-Al-F10	346	550	569		285	470	540		346	552	586		285	470	552	
40 x 5		456	762	898		376	658	851		457	766	915		376	662	862	
40 x 10		677	1180	1650	2190	557	1030	1460	1900	682	1200	1570		561	1040	1460	
50 x 5		556	916	1050	1580	455	786	995	1520	558	924	1080		456	794	1020	
50 x 10		815	1400	1940	2540	667	1210	1710	2210	824	1440	1850		674	1250	1730	
60 x 5		655	1070	1190	1820	533	910	1130	1750	658	1080	1240	1610	536	924	1170	1530
60 x 10		951	1610	2200	2870	774	1390	1940	2480	966	1680	2130	2810	787	1450	2000	2650
80 x 5		851	1360	1460	2250	688	1150	1400	2180	858	1390	1550	2010	694	1180	1470	1920
80 x 10		1220	2000	2660	3460	983	1720	2380	2990	1250	2150	2670	3520	1010	1840	2520	3340
100 x 5		1050	1650	1730	2660	846	1390	1660	2580	1060	1710	1870	2420	858	1450	1780	2320
100 x 10		1480	2390	3110	4020	1190	2050	2790	3470	1540	2630	3230	4250	1240	2250	3060	4050
100 x 15		1800	2910	3730	4490	1450	2500	3220	3880	1930	3380	4330	5710	1560	2900	4070	5400
120 x 10		1730	2750	3540	4560	1390	2360	3200	3930	1830	3090	3770	4940	1460	2650	3580	4730
120 x 5	E-Al F6,5	2090	3320	4240	5040	1680	2850	3650	4350	2280	3950	5020	6610	1830	3390	4740	6280
160 x 10		2220	3470	4390	5610	1780	2960	4000	4820	2380	4010	4820	6300	1900	3420	4590	6060
160 x 10		2670	4140	5230	6120	2130	3540	4510	5270	2960	5090	6370	8380	2370	4360	6040	8000
200 x 10		2710	4180	5230	6660	2160	3560	4790	5710	2960	4940	5880	7680	2350	4210	5620	7400
200 x 10		3230	4950	6240	7190	2580	4230	5370	6190	3660	6250	7740	10160	2920	5350	7370	9750

Remark:
Continuous currents for aluminium busbars according to the DIN regulations for rectangular bars in interior systems at +35° C air temperature and +65° C bar temperature and vertical bar position, bar packages with spaces like the bar thickness respectively minimum 50 mm by laying of 4 busbars or when working with AC-current with a main distance of > 0,8 x main conductor distance (measured middle to middle of the bars). Values for a changed ambient temperature and reducing factors for changed applications are contained in the DIN 43670.

Material indications for aluminium busbars

indication		tensile strength min. N/mm²	conductivity by + 20° C in Siemens	specific resistance by + 20° C $\frac{\text{x mm}^2}{\text{m}}$	density kg/dm³
E-Al F6,5/7	EN-AW 1350 A	65/70	34 - 35	0,0278	2,7
E-Al F8	EN-AW 1350 A	80	34 - 35	0,0286	2,7
E-Al F10	EN-AW 1350 A	100	33 - 34	0,0286	2,7

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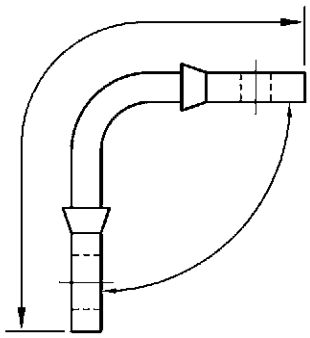
❑ Inquiry

❑ Order

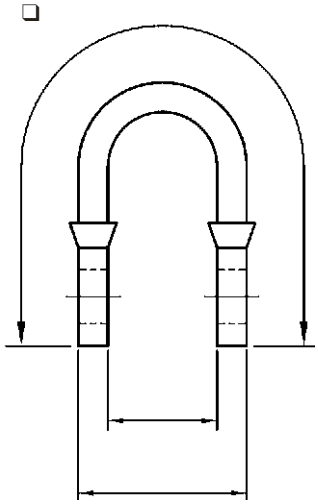
Necassary order information!

❑ straight

❑ L-shaped design



❑ U-shaped design



No. of pieces: .....

Cross-section: .....

Current-load: .....

Remarks: .....

.....

.....

.....

.....

.....

Design:

❑ E-copper braid ❑ E-copper foils ❑ Uncoated ❑ Tinned

Contact areas:

❑ Uncoated ❑ Tinned ❑ Nickel plated ❑ Silvered

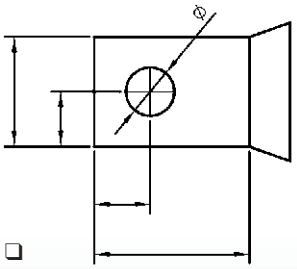
Insulation

❑ non insulated ❑ PVC sleeve ❑ Silicone sleeve ❑ others: .....

Drilling:

❑ undrilled ❑ drilling acc. sketch

❑



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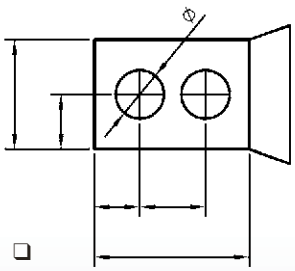

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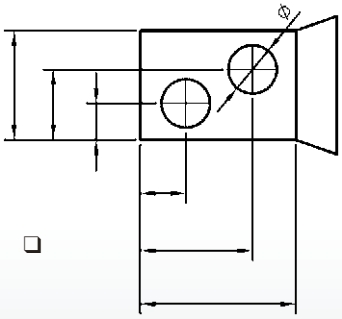

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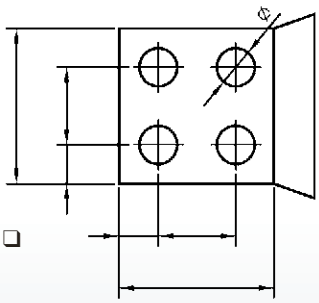

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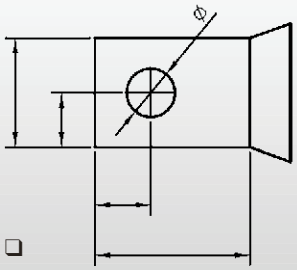

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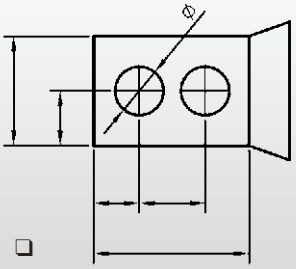

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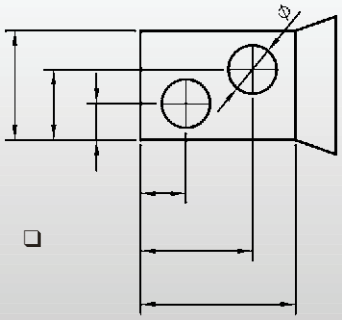

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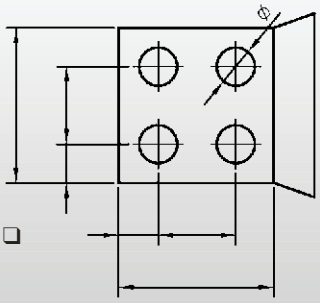

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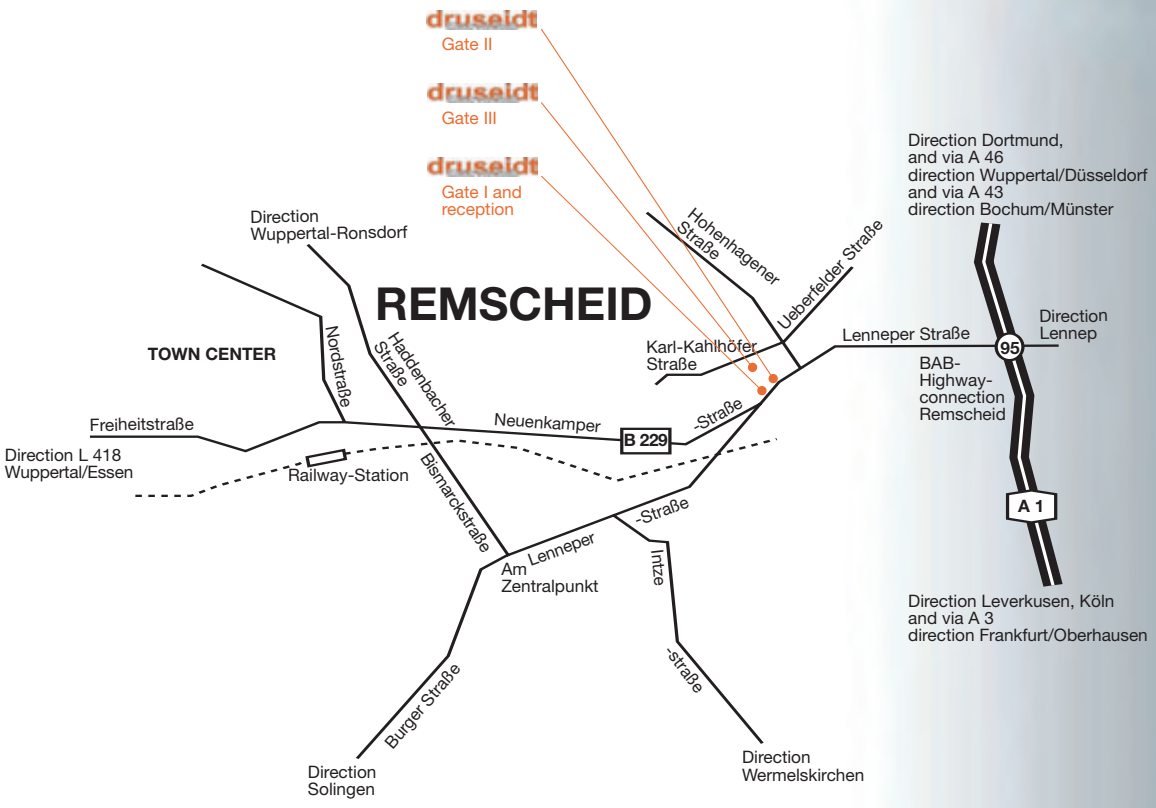

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