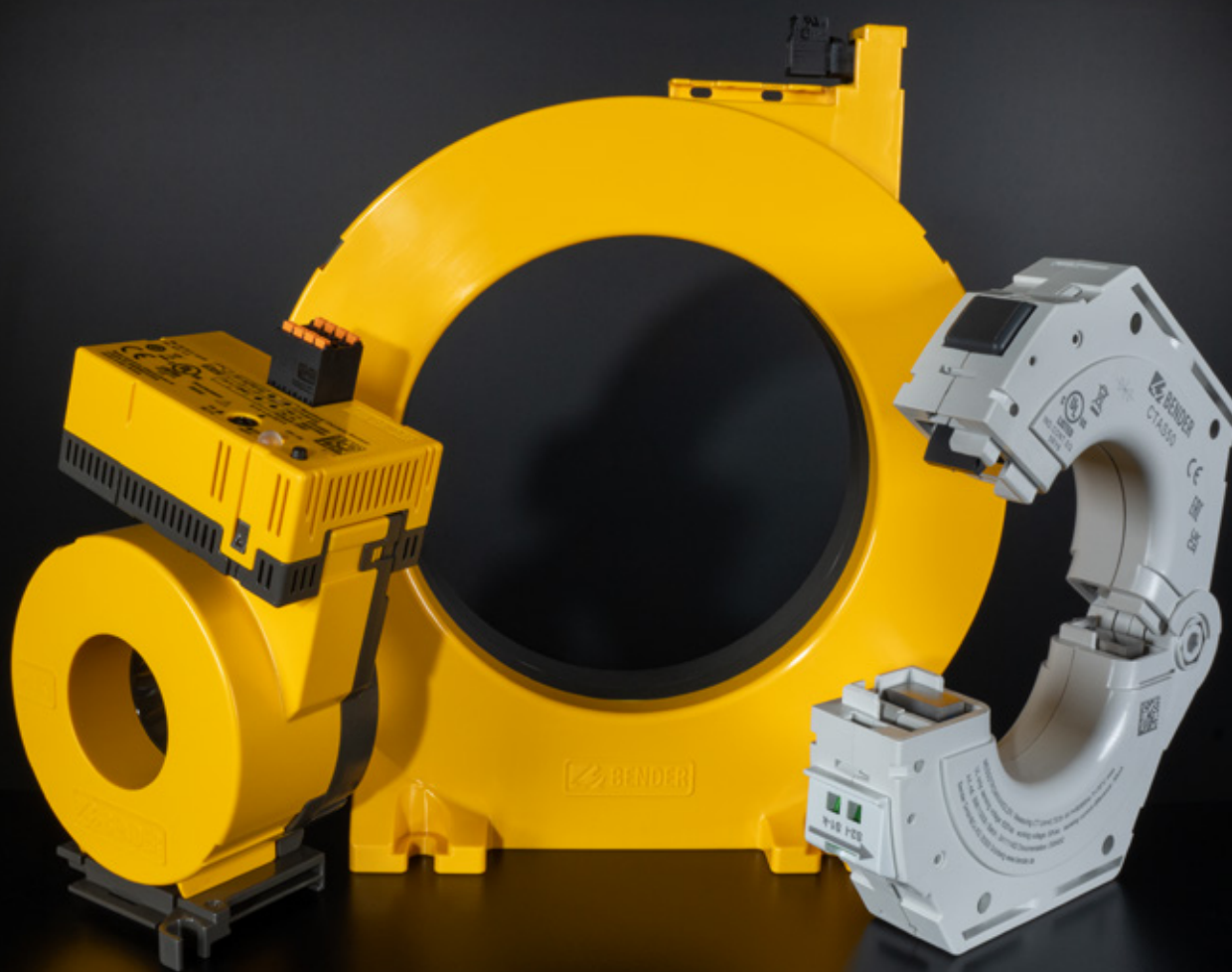


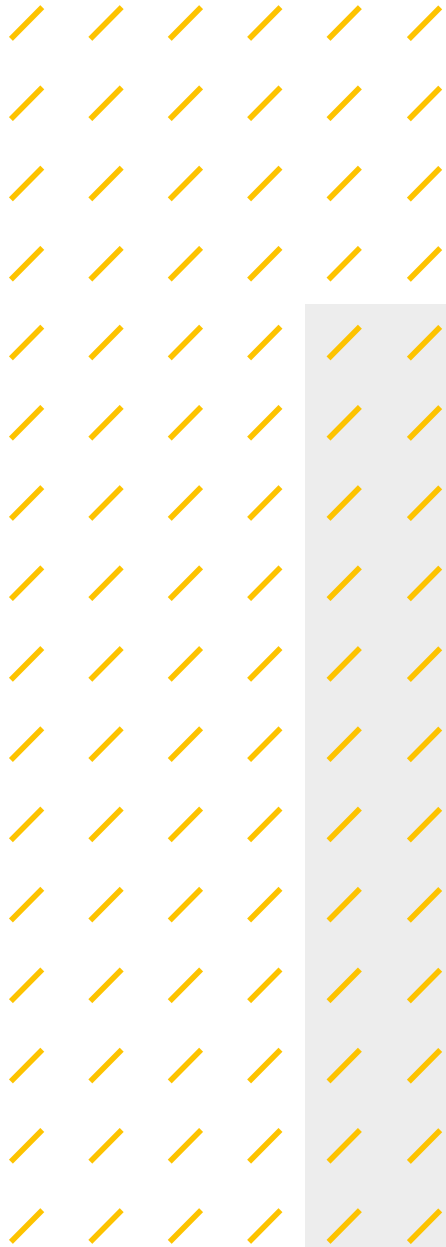
Selection guide for measuring current transformers



Design the future
of energy



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The right sensor for your electrical installation

Current transformers and suitable evaluators or measuring devices are required for monitoring electrical installations and locating insulation faults. The current transformers act as sensors. They ensure that the measured values are recorded and transmitted to the evaluator. However, every electrical installation is different. Depending on the type of system used and the voltages, currents, frequencies, etc. present in the installation, different sensors are required.

Choosing the right measuring current transformer is crucial to ensure accurate measurements.

This brochure provides an overview of our sensor portfolio. It is also intended to help you select a sensor that is suitable for your application.



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Important criteria

Present currents

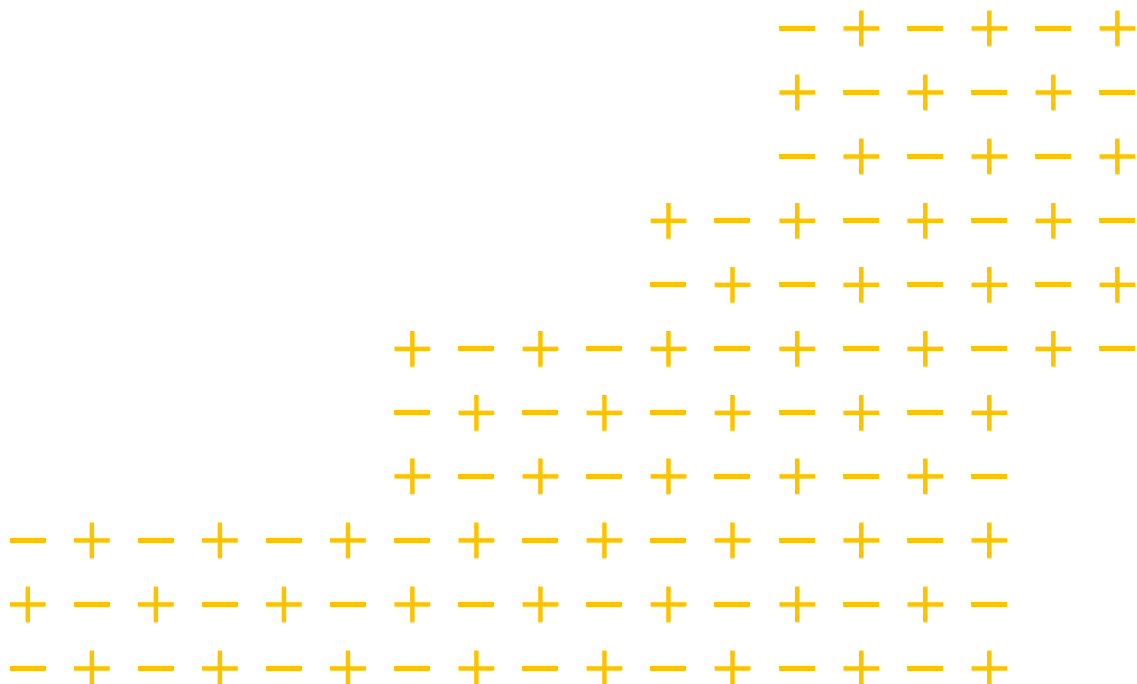
First of all, it is important to determine which currents the sensors should measure.

- For alternating currents (AC currents) and pulsating direct currents, **type A sensors** can be used (see table on pages 6 and 7).
- To measure alternating currents with direct current components or direct currents, **type B sensors** must be selected (see table on pages 8 and 9).


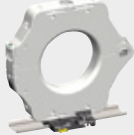






Size and design

The internal diameter of the sensor depends on the number of conductors or rails to be routed through it and their cross-section. To minimise interference, the measuring current transformers should be **as small as possible, yet as large as necessary**.

Split-core sensors are suitable for installations that are already in operation. Non-splittable sensors should be used for new installations. These are available in both circular and rectangular designs (see table on page 11).

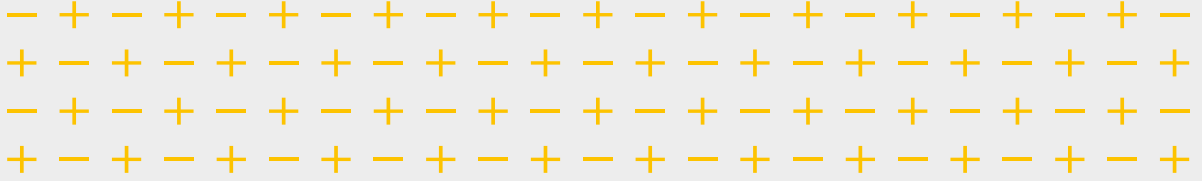
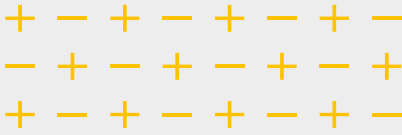








Type A sensors for alternating or pulse currents

Type A							
		CTAC series	CTAS series	W series	WS series		
Shape / Feature		circular		circular, split-core	rectangular, split-core		
Measuring current transformer type		CTAC20 CTAC20/01 CTAC35 CTAC35/01 CTAC60 CTAC120 CTAC210	CTAS50 CTAS50/01 CTAS80 CTAS80/01 CTAS120 CTAS120/01	W10/600 W0-S20 W1-S35 W2-S70 W3-S105 W4-S140 W5-S210	WS20x30 WS50x80 WS80x120 WS20x30-8000 WS50x80-8000		
Dimensions (mm)	Internal diameter	20 20 35 35 60 120 210	50 50 80 80 120 120	10 20 35 70 105 140 210	- - - - -		
	Width x Height	- - - - -	- - - - -	- - - - -	20x30 50x80 80x120 20x30 50x80		
	Band length	- - - - -	- - - - -	- - - - -	- - - - -		
Rated continuous thermal current (A)		125		100	100		
For device family	Monitoring	Type A/B	RCMS410/425	✓ - ✓ - ✓ ✓ ✓	✓ - ✓ - ✓ - ✓ -	✓ ✓ ✓ ✓ ✓ ✓ ✓	✓ ✓ ✓ - -
		Type A/B	RCMS460/490	✓ - ✓ - ✓ ✓ ✓	✓ - ✓ - ✓ - ✓ -	✓ ✓ ✓ ✓ ✓ ✓ ✓	✓ ✓ ✓ - -
		Type A	RCM420	✓ - ✓ - ✓ ✓ ✓	✓ - ✓ - ✓ - ✓ -	✓ ✓ ✓ ✓ ✓ ✓ ✓	✓ ✓ ✓ - -
		Type A	RCM410R	✓ - ✓ - ✓ ✓ ✓	✓ - ✓ - ✓ - ✓ -	✓ ✓ ✓ ✓ ✓ ✓ ✓	✓ ✓ ✓ - -
	Insulation fault location	EDS440	✓ - ✓ - ✓ ✓ ✓	✓ - ✓ - ✓ - ✓ -	✓ ✓ ✓ ✓ ✓ ✓ ✓	✓ ✓ ✓ - -	
		EDS441	- ✓ - ✓ - - -	- ✓ - ✓ - - ✓	- - - - - - -	- - - ✓ ✓	
Approvals	UL	✓ ✓ ✓ ✓ ✓ ✓ ✓	✓ ✓ ✓ ✓ ✓ ✓ ✓	- - ✓ ✓ ✓ ✓ ✓ ✓	- - - - -		
	Lloyds	✓ ✓ ✓ ✓ ✓ ✓ ✓	- - - - - - -	- ✓ ✓ ✓ ✓ ✓ ✓	- - - - -		
Art. No.		B98110005 B98110006 B98110007 B98110008 B98110017 B98110019 B98110020	B98110009 B98110012 B98110010 B98110013 B98110011 B98110014	B911761 B911787 B911731 B911732 B911733 B911734 B911735	B98080601 B98080603 B98080606 B98080602 B98080604		
Product details (product area at www.bender.de)							






Type A transformers

¹ not suitable for product standard DIN VDE 62020-1



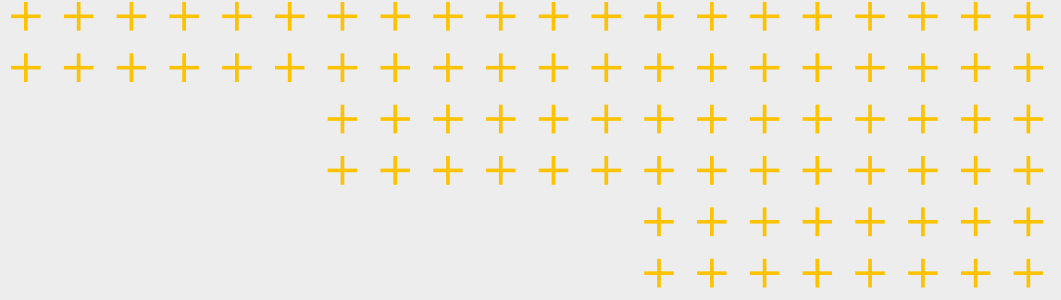
																								
WS...S series				WR series								WF series ¹												
rectangular, split-core				rectangular								flexible												
WS50x80S	WS80x80S	WS80x120S	WS80x160S	WR70x175S	WR115x305S	WR150x350S	WR200x500S	WR70x175S(P)	WR115x305S(P)	WR150x350S(P)	WR200x500S(P)	WF170-1	WF170-2	WF250-1	WF250-2	WF500-1	WF500-2	WF800-1	WF800-2	WF1200-1	WF1200-2	WF1800-1	WF1800-2	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
50x80	80x80	80x120	80x160	70x175	115x305	150x350	200x500	70x175	115x305	150x350	200x500	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	170	170	250	250	500	500	800	800	1200	1200	1800	1800	
100				100								1000												
✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	
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B911741	B911742	B911743	B911755	B911738	B911739	B911740	B911763	B911790	B911791	B911792	B911793	B78080201	B78080202	B78080203	B78080204	B78080205	B78080206	B78080207	B78080208	B78080209	B78080210	B78080221	B78080222	
																								

Type B sensors for alternating currents with direct current components or direct currents

Type B																
		CTBC series										CTUB100-CTBC series				
Shape / Feature		circular										circular				
Measuring current transformer type		CTBC20	CTBC20P ¹	CTBC35	CTBC35P ¹	CTBC60	CTBC60P ¹	CTBC120	CTBC120P ¹	CTBC210	CTBC210P ¹	CTUB101-CTBC20	CTUB101-CTBC20P ¹	CTUB101-CTBC35	CTUB101-CTBC35P ¹	CTUB101-CTBC60
Dimensions (mm)	Internal diameter	20	20	35	35	60	60	120	120	210	210	20	20	35	35	60
	Width x Height	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Band length	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rated continuous thermal current (A)		125 for UL: 30 A										125 for UL: 30 A				
For device family Monitoring	Type A/B															
	RCMS410/RCMS425	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	RCMS460/490	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Type B															
	RCMA420/423	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓	✓
	RCMB300 series	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	-
	MRCDB423	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓	✓
MRCDB300 series	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	-	
EDS441-LAB	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Approvals	UL	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Lloyds	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Art. No.		B98120001	B98120002	B98120003	B98120004	B98120005	B98120006	B98120007	B98120020	B98120008	B98120021	B78120010	B78120020	B78120012	B78120022	B78120014
Product details (product area at www.bender.de)																

Type B transformers

¹ CTUB100-CTBC series: Shielded measuring current transformers for measurements that are less sensitive to load current



CTUB100-CTBC series

CTBS

circular

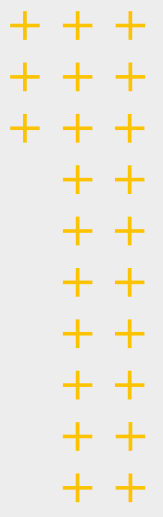
circular, split-core

CTUB101-CTBC60P ¹	CTUB101-CTBC120	CTUB101-CTBC120P ¹	CTUB101-CTBC210	CTUB101-CTBC210P ¹	CTUB102-CTBC20	CTUB102-CTBC20P ¹	CTUB102-CTBC35	CTUB102-CTBC35P ¹	CTUB102-CTBC60	CTUB102-CTBC60P ¹	CTUB102-CTBC120	CTUB102-CTBC120P ¹	CTUB102-CTBC210	CTUB102-CTBC210P ¹
60	120	120	210	210	20	20	35	35	60	60	120	120	210	210
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
125 for UL: 30 A														
-	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
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✓	✓	✓	✓	✓	-	-	-	-	-	-	-	-	-	-
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-	-	-	-	-	-	✓	-	✓	-	✓	-	-	-	-
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B78120024	B78120016	B78120026	B78120018	B78120028	B78120011	B78120021	B78120013	B78120023	B78120015	B78120025	B78120017	B78120027	B78120019	B78120029

CTBS25

68

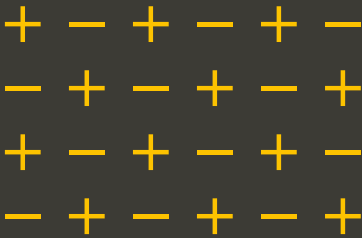
B998120060



Sensor sizes and cable cross-sections

The table on page 11 shows the suitable sensor sizes depending on the cables used.

Please note:
The dimensions specified in the table are theoretical sensor dimensions according to the installation instructions in the data sheets. In practice, deviations may occur depending on the cables used and the installation conditions. If the installation conditions require it, a larger sensor can also be used for better connectivity.



The specifications for the maximum conductor cross-section apply exclusively to circular conductors. When using sector conductors, these values may differ.

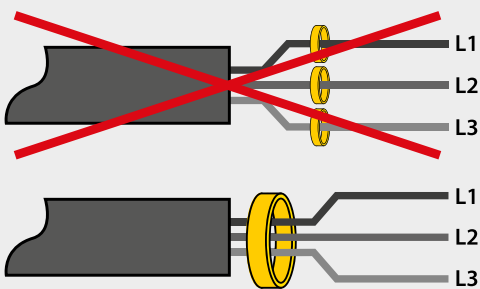


cables / cross-sections (mm ²) Basic insulation only Number of conductors routed through the sensor (without PE)	Sensor types					
	CTAC series, CTBC series	CTAS series	W0-S20... W5-S210	WS	WS50x80S... WS80x160S	WF
	circular (mm)	circular (mm)	circular (mm)	rectangular (mm)	rectangular (mm)	flexible (mm)
3x1.5	20	50	20	20x30	-	170
4x1.5	20	50	20	20x30	-	170
6x1.5	20	50	20	20x30	-	170
2x2.5	20	50	20	20x30	-	170
3x2.5	20	50	20	20x30	-	170
4x2.5	20	50	20	20x30	-	170
6x2.5	20	50	20	20x30	-	170
2x4	20	50	20	20x30	-	170
3x4	20	50	20	20x30	-	170
4x4	20	50	20	20x30	-	170
2x6	20	50	20	20x30	-	170
3x6	20	50	20	20x30	-	170
4x6	20	50	20	20x30	-	170
2x10	20	50	20	20x30	-	170
3x10	35	50	35	20x30	-	170
4x10	35	50	35	20x30	-	170
2x16	35	50	35	20x30	50x80	170
3x16	35	50	35	20x30	50x80	170
4x16	35	50	35	50x80	50x80	170
2x25	35	50	35	50x80	50x80	170
3x25	35	50	35	50x80	50x80	170
4x25	35	50	35	50x80	50x80	170
2x35	35	50	35	50x80	50x80	170
3x35	35	50	35	50x80	50x80	170
4x35	60	50	60	50x80	50x80	170
2x50	60	50	70	50x80	50x80	170
3x50	60	50	70	50x80	50x80	170
4x50	60	50	70	50x80	50x80	170
2x70	60	50	70	50x80	50x80	170
3x70	60	50	70	50x80	50x80	170
4x70	60	80	70	50x80	50x80	250
2x95	60	80	70	50x80	50x80	250
3x95	60	80	70	50x80	50x80	250
4x95	60	80	70	50x80	50x80	250
2x120	60	80	70	50x80	50x80	250
3x120	60	80	70	50x80	50x80	250
4x120	120	80	105	80x120	80x80	250
2x150	60	80	70	50x80	50x80	250
3x150	120	80	105	80x120	80x80	250
4x150	120	80	105	80x120	80x80	250
2x185	120	80	105	80x120	80x80	250
3x185	120	80	105	80x120	80x80	250
4x185	120	120	105	80x120	80x80	500
2x240	120	120	105	80x120	80x80	500
3x240	120	120	105	80x120	80x120	500
4x240	120	120	105	80x120	80x120	500

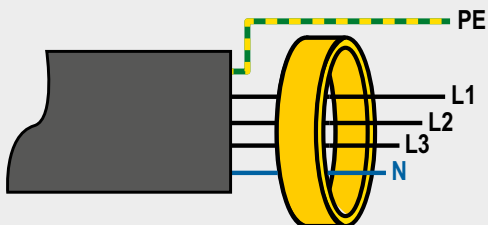
Installation instructions

To ensure optimum operation of the measuring current transformers, a few instructions must be observed during installation.

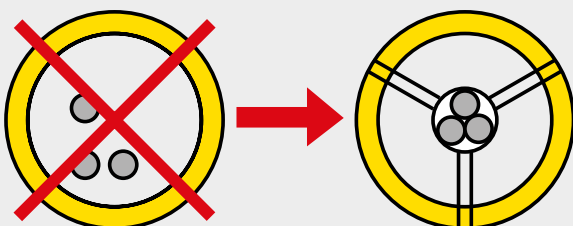
1. All current-carrying cables must be routed together through the sensor.



2. If there is a protective conductor, it must never be routed through the sensor.

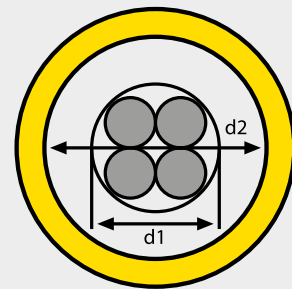


3. The conductors must be centred in the sensor. Cables and busbars should be routed through the measuring current sensor as symmetrically and at right angles as possible.

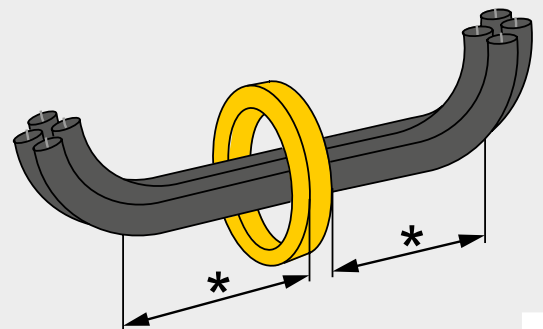


Product-specific installation instructions and specifications must be observed and can be found in the respective data sheet.

4. Ideally, the internal diameter of the sensor should be $d2 \geq 2 \times d1$ (cable diameter)



5. The primary conductors should only be bent from the specified minimum distance. The minimum bending radius specified by the manufacturers must be observed.



6. The measuring current transformer should not be placed near large magnetic fields, as these stray fields may interfere with the sensor's output signal.

Contact persons

Our experts are at your disposal to support you with planning and configuration.

Find your Bender contact persons here:

Sales department Germany



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E-mail: vertrieb.inland@bender.de





Bender. Making your world safe.

Our world is networked on a global scale; it is digital, mobile and highly automated. And no matter whether in hospitals, in industry, inside or outside buildings, in power stations, in trains, underwater or underground: it never stands still and it is more dependent than ever on a reliable and, above all, safe electrical power supply.

And exactly that is our mission: we make electricity safe. With our technologies, we ensure that electricity is permanently available and guarantee faultless protection against the hazards of electric shock. We protect buildings, plants and devices and therefore your investments and plans. But what we primarily protect are the lives of the people who are involved with electricity.



Mechanical and plant engineering



Oil, gas



Renewable energy



Healthcare



Public power supply network



Mobile generators



Ships and ports



Railway



eMobility



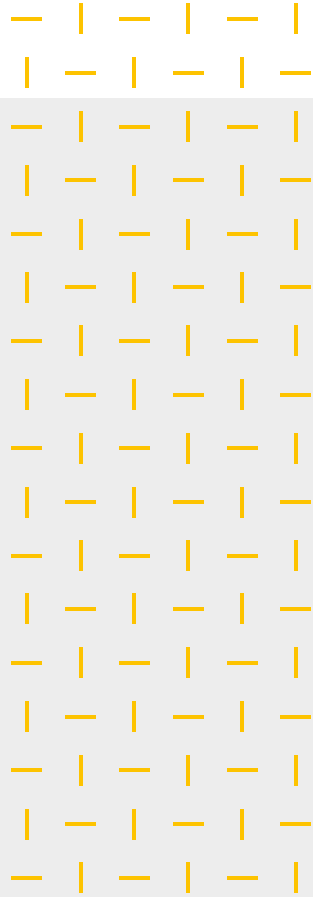
Data centres



Mining



Battery energy storage systems (BESS)



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