

XCTB - Current transformers for power quality

High-precision harmonic
measurements up to 20 kHz

GMW – We make your values visible

We provide our customers with our products the entire spectrum to solve everything EMAS tasks and thus tools for sustainable use of electrical energy. As a complete provider we also realize the whole project from A to Z, from project consulting to commissioning, training and maintenance.

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New measuring requirements for inductive current transformers in the low-voltage range

Changes to the structure of generation and consumption

Over the last few years, the proportion of renewable energy in Germany has grown massively. Wind, biomass, photovoltaic and hydroelectric plants now make up approximately 30% of the country's energy mix.

Unlike in conventional nuclear or coal-fired power stations, where all synchronous generators are used to produce electricity, here inverters or frequency converters are used. As such, it is not always possible to achieve a clean sine wave.

The distortions are caused by the switching semiconductor elements in the inverter. Harmonics generated in this way are whole multiples of the first harmonic and can extend far into the single-digit kilohertz range. The total harmonic distortion (THD) factor¹ specifies the undesirable distortion ratio of the 50 Hz sinusoidal oscillation and regularly reaches between 10 and 30%.

In addition to the harmonics produced by inverters on the generator side, there have also been changes on the consumer side in recent years. Non-linear consumers such as LED or energy-saving lamps are pushing linear ones, like traditional incandescent bulbs, out of our daily lives almost completely.

Plug-in power supply units for mobile phones and laptops are no longer made from small transformers either, but from semiconductor circuits known as switched-mode power supplies. It would not be possible to create such small, light power supply units any other way. But these benefits are set against one big disadvantage: the current is drawn from the public grid not as a sinusoidal waveform, but in pulses. The figure below illustrates this:

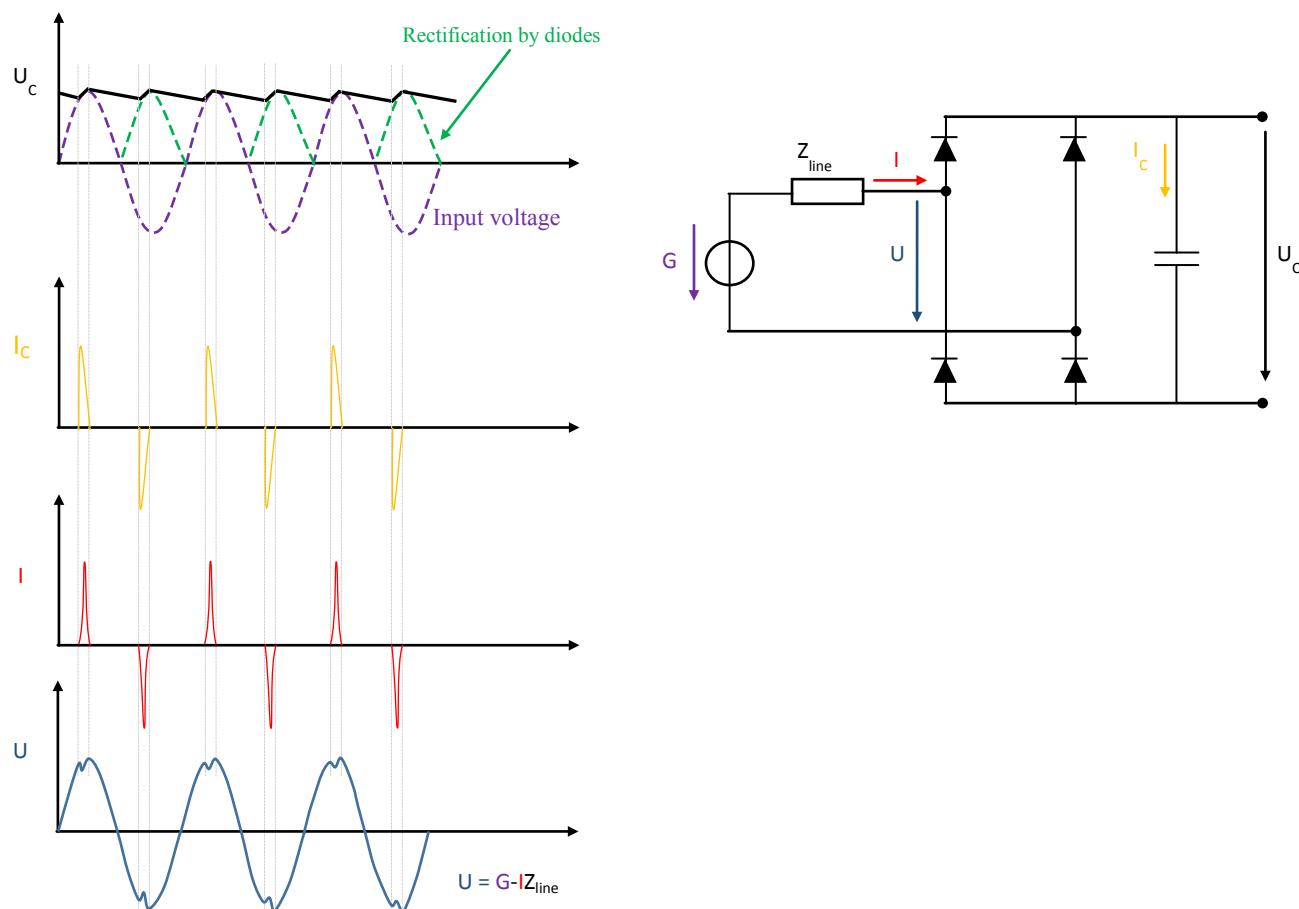


Figure 1: Bridge rectifier with pulsed current draw

The filter capacitor shown in the diagram not only smooths the required output voltage, it is also recharged in pulses by the rectifier diodes. These steep current peaks generate reactive power on the one hand, and harmonics on the other.

¹ The THD is the ratio of the harmonic component to the first harmonic

Standards regulate limit values – but not always!

There is already a corresponding set of international norms that limits harmonic currents in end devices with a power consumption > 75 W. Devices under 75 W are not currently covered by standards. In the interests of keeping costs down, manufacturers do not usually implement filter measures or complex power factor correction. The EN 61000-3-2 set of standards does not come into play until the 25 W mark for lamps either; for example, where energy-saving lamps are concerned, THD_I values of 30 to 70% and higher are not uncommon during warm-up and in continuous duty. It should also be noted that, even when they do kick in, the standards only define limit values up to 2 kHz. As a result, manufacturers have hardly taken interference suppression into account at all when developing electronic products for the frequency range > 2 kHz in the past.

In addition, more and more electrical motors with variable-frequency drive technology are being used in the industrial sector. Today already, the percentage of electrical motors sold that have a frequency-controlled drive stands at around 40%. The majority of these motors utilise pulse width modulation technology, which can generate THD_I values in the range from 100 to 120%. Clean sine waves are almost impossible to identify at these values.

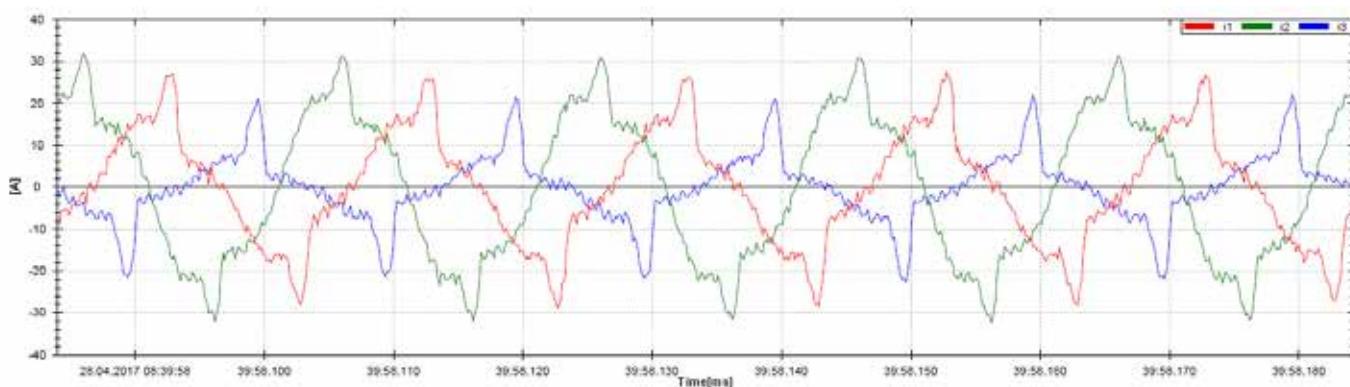


Figure 2: Flow of current for an industrial customer on the low-voltage grid

Power electronics have so many benefits that we can categorically state there will be no return to linear consumers such as the traditional incandescent bulb. In fact, we can expect harmonic loads to increase even further in European grids, due to the development of alternative sources of energy and the growth of non-linear consumers. We should also bear in mind that having lots of consumers that are not regulated by standards could cause considerable interference overall.

Filter systems have already had to be installed in office buildings where just computers, telephone systems and energy-efficient bulbs are used, in order to bring problems with harmonics under control.

Effects of harmonics

Grid operators are primarily interested in the economic effects of harmonics. When it comes to harmonic **currents**, the most important phenomena are as follows²:

- Overloading of neutral conductors
- Overheating of transformers
- False tripping of circuit breakers/minиature circuit breakers
- Overstressing of power-factor correction capacitors
- Skin effects

If the distortion level in the supply **voltage** reaches a value > 10%, this shortens the lifetime of devices considerably. This reduction is estimated as follows:

- 32.5% for 1-phase machines
- 18% for 3-phase machines
- 5% for transformers.

To maintain the lifetime expected from the nominal load, the devices named above must be over-dimensioned.

² Schneider Electric Wiki (accessed 09/01/2018) http://de.electrical-installation.org/dewiki/Wirtschaftliche_Auswirkungen#St.C3.B6rungsausl.C3.B6sung_und_Anlagenausfall

Standard regulation for distribution network operators

The latest draft of VDE-AR-N 4100¹ deals with this matter. Point 5.4.4.3 of this regulation refers to harmonic currents of up to **9 kHz** that need to be monitored and covers not only **generating plants**, but also **receiving plants** and **storage systems**. The customer should liaise with the grid operator and take action to reduce harmonic currents – particularly by constructing filter circuits. In future we can assume, therefore, that current measurements up to 9 kHz will be taken continuously across the whole low-voltage network.

Looking at the overall picture of the rise in distributed energy generation plants and non-linear consumers, we can see this is a very sensible move. Grid operators and their customers will need measuring equipment that can accurately record harmonic currents of up to 9 kHz.

Current transformers up to 20 kHz

GMW offers the full series of XCTB current transformers for measurements up to 20 kHz. These products guarantee high-precision transmission up to 20 kHz on the one hand, and are designed to withstand the thermal demands of running in networks subject to harmonics on the other.

Output signals are 1 or 5 A, just like with the familiar inductive current transformer to IEC 61869-2. Performance data corresponds to standard values too. As a result, these transformers can also be used in conventional 50 Hz applications. An additional rating plate defines the frequency transmission behaviour.

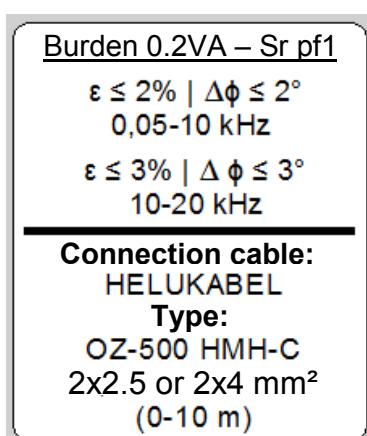
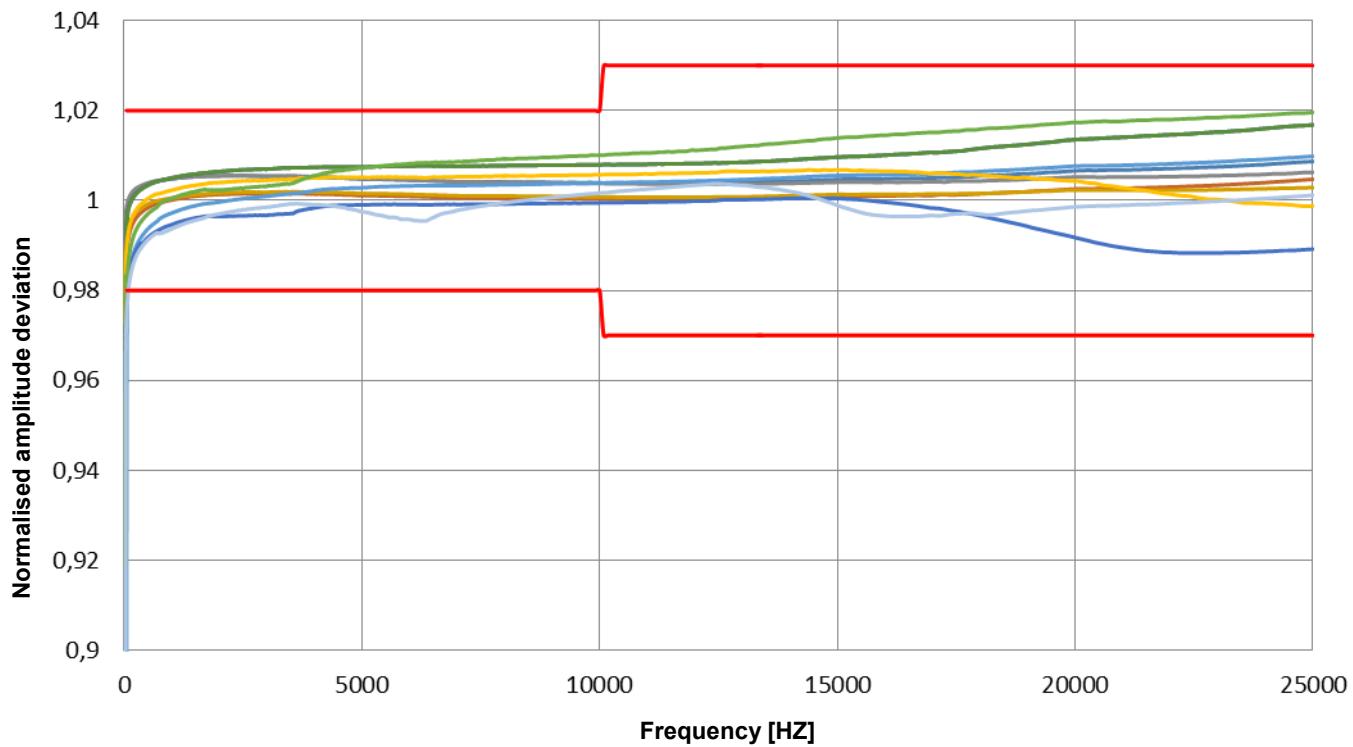
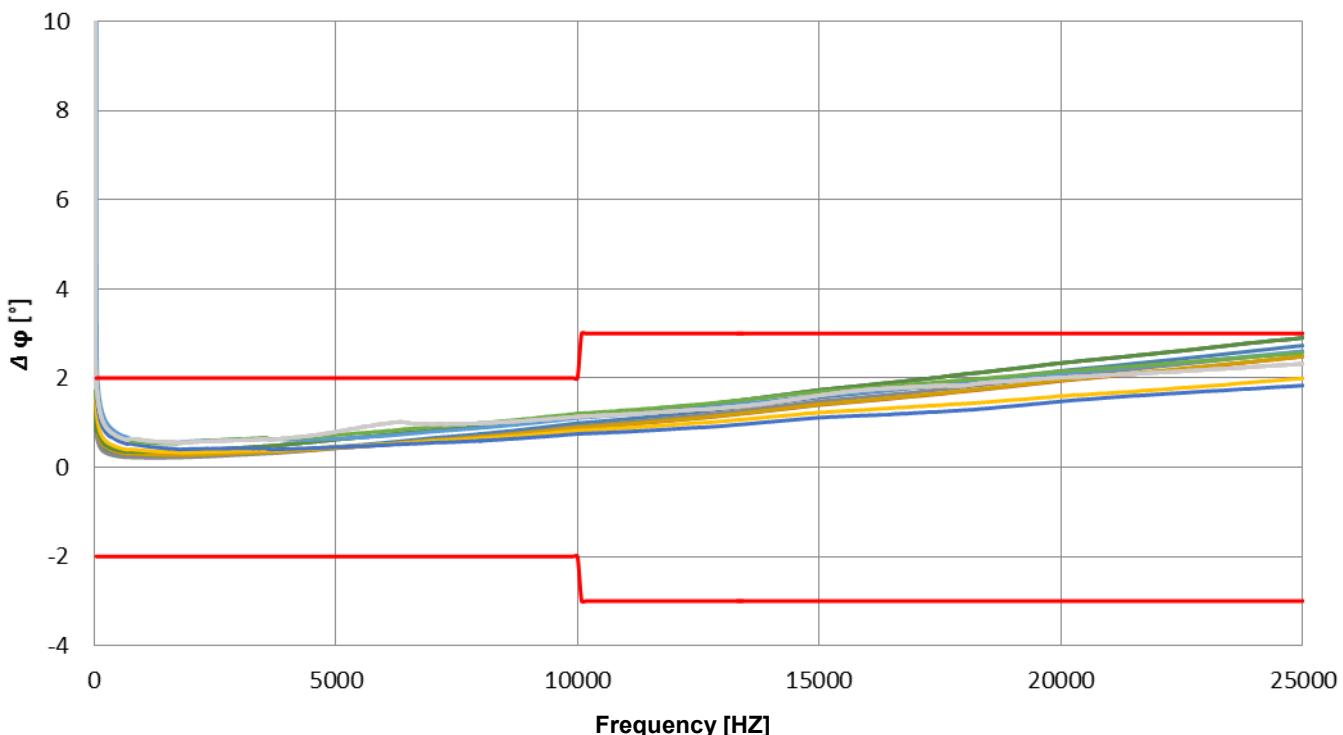


Figure 4: Frequency transmission behaviour

Since the connecting cable affects the load and the transmission behaviour more if it is long, we recommend the OZ-500 HMH-C cable from Helukabel GmbH (2 x 2.5 mm² or 2 x 4 mm² version) for harmonic measurements up to 20 kHz. GMW carries out its accuracy tests using this type of cable too. The customer can now benefit from a consistent measuring chain and reliable measured values in the frequency range up to 20 kHz.

What's more, the XCTB series offers improved insulation resistance to voltage peaks and can also be used for operating voltages up to 1000 V in accordance with an insulation rating of 1.2 / 6 / – kV.

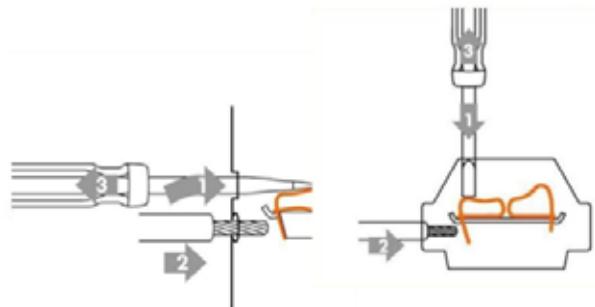
¹ TAR low voltage (E VDE-AR-N 4100): draft published 28/04/2017

Typical frequency responses of the XCTB with resistive load**Amplitude deviation****Phase error in degrees**

Plug-in current transformers with screwless “Cage Clamp®” connection system, for power quality applications up to 20 kHz

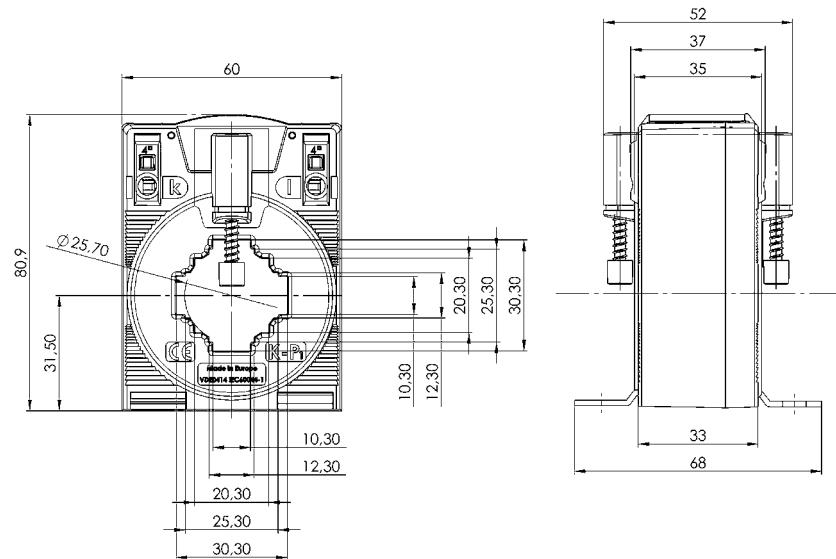


Screwless connection system thanks to “Cage Clamp®” spring-type terminal (front or top)



Further information:

- Innovative, time-saving connection option (front or top) for solid and flexible conductors, max. 4 mm² – no need for ferrule terminals
- Resistant to shock and vibration
- Maintenance-free, gas-tight connection
- High current-carrying capacity and high mechanical retention forces
- Low-voltage current transformers for max. operating voltages U_m up to 1.2 kV, can be used in 690 V networks
- Insulation test voltage: 6 kV, U_{rms}, 50 Hz, 1 min
- **Higher insulation level 1.2/6/12 kV – tested lightning impulse voltage for 690 V systems acc. to IEC 61439-1 and -2**
- Available in nominal current ranges 50...2000 A
- Accuracy classes @ 50 Hz: 1; 0.5; 0.5S, 0.2 and 0.2S
- **Connecting cable for harmonic measurements: HELUKABEL type: OZ-500 HMH-C with 2x2.5 or 2x4 mm² (0–10 m)**
- Harmonic measurements with load 0.2 VA – Sr pf1 (power factor 1)
- Measuring accuracy up to 20 kHz: $\epsilon \leq 2\% | \Delta\phi \leq 2^\circ @ 0.05-10 \text{ kHz} || \epsilon \leq 3\% | \Delta\phi \leq 3^\circ @ 10-20 \text{ kHz}$
- Can be continuously overloaded with 120% of the primary nominal voltage
- Suitable for networks subject to harmonics with fundamental frequencies of 50 Hz or 60 Hz
- Insulation class: E
- Working temperature range: -5 °C < T < +50 °C
- Storage temperature range: -25 °C < T < +70 °C
- Unbreakable plastic housing made of polycarbonate, self-extinguishing, flame resistant
- Packing unit: 1 piece
- Customs tariff number: 85043129

XCTB 31.35**Plug-in current transformers****Dimensions:**

Bus bar 1: 30 x 10 mm
 Bus bar 2: 25 x 12 mm
 Bus bar 3: 20 x 20 mm
 Circular conductor: 25.7 mm
 Installation width: 60 mm
 Installation height: 80.9 mm
 Overall installation depth: 52 mm

Technical data:

Therm. nominal continuous current I_{cth} : $1.2 \times I_N$
 Therm. nominal short-time current I_{th} : $60 \times I_N$, 1 s
 Max. operating voltage U_m : 1.2 kV, U_{rms}
 Insulation test voltage: 6 kV, U_{rms} , 50 Hz, 1 min
Lightning impulse voltage: 12 kV, 1.2/50 μ s
 Nominal frequency: 50/60 Hz
 Technical standards applied: DIN EN 61869, Part 1 + 2
 Harmonic measurements with load 0.2 VA – Sr pf1
 Measuring accuracy up to 20 kHz: $\epsilon \leq 2\% | \Delta\phi \leq 2^\circ @ 0.05-10 \text{ kHz}$
 $\epsilon \leq 3\% | \Delta\phi \leq 3^\circ @ 10-20 \text{ kHz}$

Ordering table for XCTB 31.35 with secondary current 5 A

Secondary current		5 A				
Primary current [A]	Rated power [VA]	Accuracy class				
		1	0.5	0.5S	0.2	0.2S
		Order no.	Order no.	Order no.	Order no.	Order no.
60	1.25	10051-0001				
75	2.5	10051-0002				
80	2.5	10051-0003				
100	1.5		10051-0014	10051-0033	10051-0052	
	2.5	10051-0004	10051-0015	10051-0034		
125	1		10051-0016	10051-0035	10051-0053	10051-0067
	1.5		10051-0017	10051-0036	10051-0054	10051-0068
	2.5	10051-0005	10051-0018	10051-0037		
150	1.5		10051-0019	10051-0038	10051-0055	10051-0069
	2.5		10051-0020	10051-0039		
	5	10051-0006				
200	1.5		10051-0021	10051-0040	10051-0056	
	2.5		10051-0022	10051-0041	10051-0057	
	5	10051-0007	10051-0023	10051-0042	10051-0070	
250	2.5		10051-0024	10051-0043	10051-0058	10051-0071
	5		10051-0025	10051-0044	10051-0059	10051-0008
300	2.5		10051-0026	10051-0045	10051-0060	10051-0072
	5	10051-0009	10051-0027	10051-0046	10051-0061	10051-0073
400	5	10051-0010	10051-0028	10051-0047	10051-0062	10051-0074
500	2.5		10051-0029	10051-0048	10051-0063	10051-0075
	5	10051-0011	10051-0030	10051-0049	10051-0064	10051-0076
600	5	10051-0012	10051-0031	10051-0050	10051-0065	10051-0077
750	5	10051-0013	10051-0032	10051-0051	10051-0066	10051-0078

Ordering table for XCTB 31.35 with secondary current 1 A

Secondary current		1 A				
Primary current [A]	Rated power [VA]	Accuracy class				
		1	0.5	0.5S	0.2	0.2S
		Order no.	Order no.	Order no.	Order no.	Order no.
50	0.5	10051-2001				
60	1.25	10051-2002				
75	2.5	10051-2003				
80	2.5	10051-2004				
100	1.5		10051-2015	10051-2034	10051-2053	
	2.5	10051-2005	10051-2016	10051-2035		
125	1		10051-2017	10051-2036	10051-2054	
	1.5		10051-2018	10051-2037	10051-2055	10051-2067
	2.5	10051-2006	10051-2019	10051-2038		
150	1.5		10051-2020	10051-2039	10051-2056	10051-2068
	2.5		10051-2021	10051-2040		
	5	10051-2007				
200	1.5		10051-2022	10051-2041	10051-2057	10051-2069
	2.5		10051-2023	10051-2042	10051-2058	10051-2070
	5	10051-2008	10051-2024	10051-2043		
250	2.5		10051-2025	10051-2044	10051-2059	
	5	10051-2009	10051-2026	10051-2045	10051-2071	
300	2.5		10051-2027	10051-2046	10051-2060	10051-2072
	5	10051-2010	10051-2028	10051-2047	10051-2061	
400	5	10051-2011	10051-2029	10051-2048	10051-2062	10051-2073
	2.5		10051-2030	10051-2049	10051-2063	10051-2074
500	5	10051-2012	10051-2031	10051-2050	10051-2064	
	5	10051-2013	10051-2032	10051-2051	10051-2065	10051-2075
600	5	10051-2014	10051-2033	10051-2052	10051-2066	10051-2076
750	5					

Accessories

Quick-fix (order no.: 10055021)



Cover sealing
(order no.: 10059057)

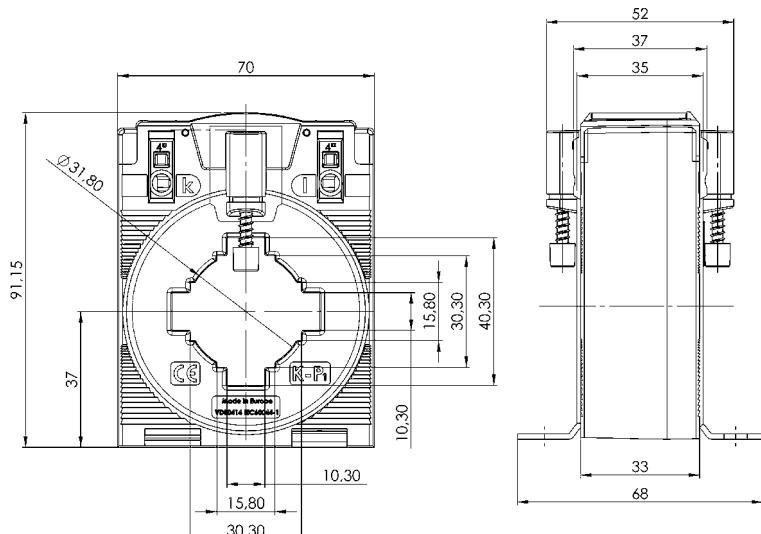


Snap-on mount for installing the transformer on a
35 mm DIN rail (order no.: 10055015)



XCTB 41.35

Plug-in current transformers



Dimensions:

Bus bar 1: 40 x 10 mm
 Bus bar 2: 30 x 15 mm
 Circular conductor: 31.8 mm
 Installation width: 70 mm
 Installation height: 91.15 mm
 Overall installation depth: 52 mm

Technical data:

Therm. nominal continuous current I_{cth} : $1.2 \times I_N$
 Therm. nominal short-time current I_{th} : $60 \times I_N$, 1 s
 Max. operating voltage U_m : 1.2 kV, U_{rms}
 Insulation test voltage: 6 kV, U_{rms} , 50 Hz, 1 min
Lightning impulse voltage: 12 kV, 1.2/50 μ s
 Nominal frequency: 50/60 Hz
 Technical standards applied: DIN EN 61869, Part 1 + 2
 Harmonic measurements with load 0.2 VA – Sr pf1
 Measuring accuracy up to 20 kHz: $\epsilon \leq 2\% | \Delta\phi \leq 2^\circ$ @ **0.05–10 kHz**
 $\epsilon \leq 3\% | \Delta\phi \leq 3^\circ$ @ **10–20 kHz**

Ordering table for XCTB 41.35 with secondary current 5 A

Secondary current		5 A				
Primary current [A]	Rated power [VA]	Accuracy class				
		1	0.5	0.5S	0.2	0.2S
125	2.5	10051-0101				
150	2.5	10051-0102				
200	1.5		10051-0112	10051-0126		
	2.5		10051-0113			
250	5	10051-0103				
	2.5		10051-0114	10051-0127		
300	2.5		10051-0115	10051-0128		
	5	10051-0105	10051-0116			
400	5	10051-0106	10051-0117	10051-0129		
500	2.5		10051-0118	10051-0130	10051-0136	
	5	10051-0107	10051-0119	10051-0131		
600	2.5		10051-0120	10051-0132	10051-0137	10051-0141
	5	10051-0108	10051-0121	10051-0133	10051-0138	
750	2.5		10051-0122	10051-0134	10051-0139	10051-0142
	5	10051-0109	10051-0123	10051-0135	10051-0140	10051-0143
800	5	10051-0110	10051-0124			
1000	5	10051-0111	10051-0125			

Ordering table for XCTB 41.35 with secondary current 1 A

Secondary current		1 A				
Primar y current [A]	Rated power [VA]	Accuracy class				
		1	0.5	0.5S	0.2	0.2S
		Order no.	Order no.	Order no.	Order no.	Order no.
75	1	10051-2101				
80	1	10051-2102				
100	1.25	10051-2103				
125	2.5	10051-2104				
150	2.5	10051-2105				
200	1.5		10051-2115	10051-2129		
	2.5		10051-2116			
	5	10051-2106				
250	2.5		10051-2117	10051-2130		
	5	10051-2107				
300	2.5		10051-2118	10051-2131		
	5	10051-2108	10051-2119			
400	5	10051-2109	10051-2120	10051-2132		
500	2.5		10051-2121	10051-2133	10051-2139	
	5	10051-2110	10051-2122	10051-2134		
600	2.5		10051-2123	10051-2135	10051-2140	
	5	10051-2111	10051-2124	10051-2136	10051-2141	
750	2.5		10051-2125	10051-2137	10051-2142	
	5	10051-2112	10051-2126	10051-2138		
800	5	10051-2113	10051-2127			
1000	5	10051-2114	10051-2128			

Accessories

Quick-fix (order no.: 10055021)

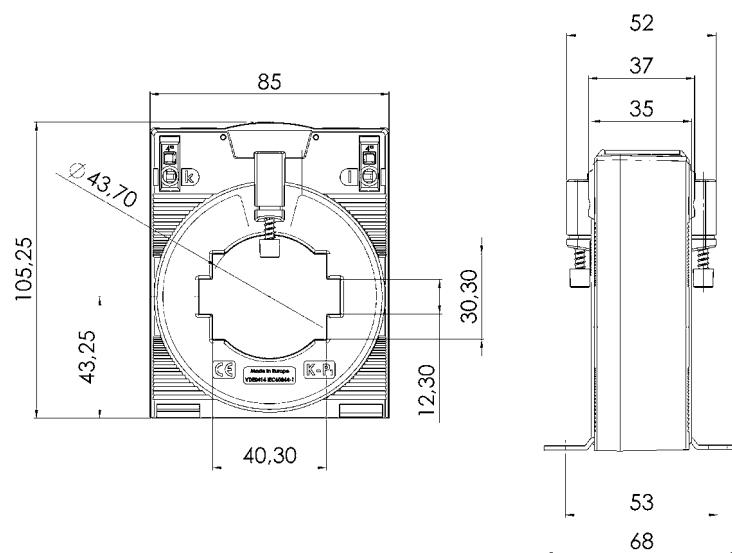


Cover sealing
(order no.: 10059057)



Snap-on mount for installing the transformer on a
35 mm DIN rail (order no.: 10055015)



XCTB 51.35**Plug-in current transformers****Dimensions:**

Bus bar 1: 50 x 12 mm
 Bus bar 2: 40 x 30 mm
 Circular conductor: 43.7 mm
 Installation width: 85 mm
 Installation height: 105.25 mm
 Overall installation depth: 52 mm

Technical data:

Therm. nominal continuous current I_{cth} : $1.2 \times I_N$
 Therm. nominal short-time current I_{th} : $60 \times I_N$, 1 s
 Max. operating voltage U_m : 1.2 kV, U_{rms}
 Insulation test voltage: 6 kV, U_{rms} , 50 Hz, 1 min
Lightning impulse voltage: 12 kV, 1.2/50 μ s
 Nominal frequency: 50/60 Hz
 Technical standards applied: DIN EN 61869, Part 1 + 2
 Harmonic measurements with load 0.2 VA – Sr pf1
 Measuring accuracy up to 20 kHz: $\epsilon \leq 2\% | \Delta\phi \leq 2^\circ @ 0.05-10 \text{ kHz}$
 $\epsilon \leq 3\% | \Delta\phi \leq 3^\circ @ 10-20 \text{ kHz}$

Ordering table for XCTB 51.35 with secondary current 5 A

Secondary current		5 A				
Primary current [A]	Rated power [VA]	Accuracy class				
		1	0.5	0.5S	0.2	0.2S
		Order no.	Order no.	Order no.	Order no.	Order no.
100	1.25	10051-0201				
	1.5		10051-0215	10051-0236		
125	1.5		10051-0216	10051-0237		
	2.5	10051-0202				
150	2.5	10051-0203	10051-0217	10051-0238		
200	1.5		10051-0218	10051-0239	10051-0254	
	2.5		10051-0219	10051-0240		
	5	10051-0204				
250	1.5		10051-0220	10051-0241	10051-0255	10051-0268
	2.5		10051-0221	10051-0242	10051-0256	
	5	10051-0205				
300	2.5		10051-0222	10051-0243	10051-0257	10051-0269
	5	10051-0206	10051-0223	10051-0244	10051-0258	
400	2.5		10051-0224	10051-0245	10051-0259	10051-0270
	5	10051-0207	10051-0225	10051-0246	10051-0260	
500	2.5		10051-0226	10051-0247	10051-0261	10051-0271
	5	10051-0208	10051-0227	10051-0248	10051-0262	10051-0272
600	2.5		10051-0228	10051-0249	10051-0263	10051-0273
	5	10051-0209	10051-0229	10051-0250	10051-0264	10051-0274
750	2.5		10051-0230	10051-0251	10051-0265	10051-0275
	5	10051-0210	10051-0231	10051-0252	10051-0266	10051-0276
800	5	10051-0211	10051-0233			
1000	5	10051-0212	10051-0232	10051-0253	10051-0267	10051-0277
1200	5	10051-0213	10051-0234			
1250	5	10051-0214	10051-0235			

Ordering table for XCTB 51.35 with secondary current 1 A

Secondary current		1 A				
Primary current [A]	Rated power [VA]	Accuracy class				
		1	0.5	0.5S	0.2	0.2S
		Order no.	Order no.	Order no.	Order no.	Order no.
100	1.25	10051-2201				
	1.5		10051-2215	10051-2237		
125	1.5		10051-2216	10051-2238		
	2.5	10051-2202				
150	2.5	10051-2203	10051-2217	10051-2239		
200	1.5		10051-2218	10051-2240	10051-2256	
	2.5		10051-2219	10051-2241	10051-2257	
	5	10051-2204				
250	1.5		10051-2220	10051-2242	10051-2258	10051-2270
	2.5		10051-2221	10051-2243	10051-2259	
	5	10051-2205	10051-2222	10051-2244		
300	2.5		10051-2223	10051-2245	10051-2260	10051-2271
	5		10051-2224	10051-2246	10051-2261	10051-2206
400	2.5		10051-2225	10051-2247	10051-2262	
	5	10051-2207	10051-2226	10051-2248	10051-2272	
500	2.5		10051-2227	10051-2249	10051-2263	10051-2273
	5	10051-2208	10051-2228	10051-2250	10051-2264	10051-2274
600	2.5		10051-2229	10051-2251	10051-2265	10051-2275
	5	10051-2209	10051-2230	10051-2252	10051-2266	
750	2.5		10051-2231	10051-2253	10051-2267	10051-2276
	5	10051-2210	10051-2232	10051-2254	10051-2268	
800	5	10051-2211	10051-2233			
1000	5	10051-2212	10051-2234	10051-2255	10051-2269	10051-2277
1200	5	10051-2213	10051-2235			
1250	5	10051-2214	10051-2236			

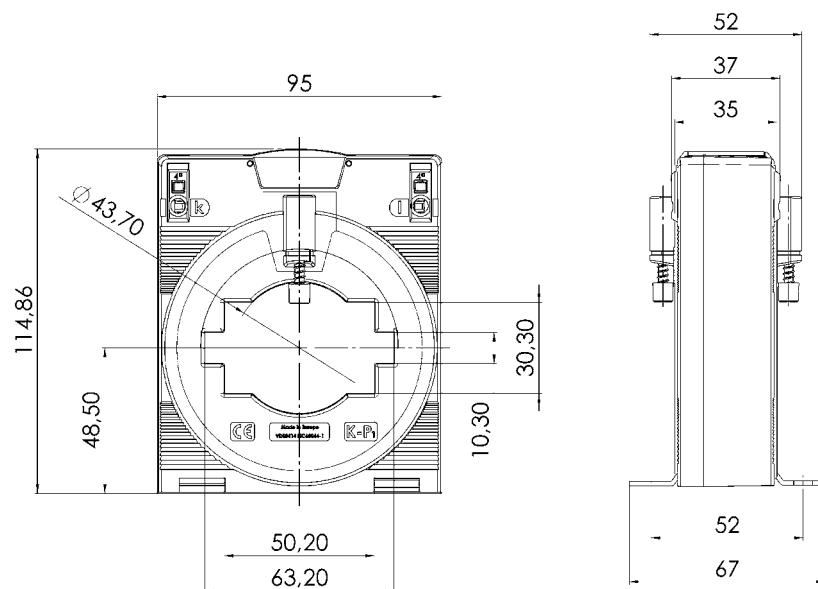
Accessories

Quick-fix (order no.: 10055021)



Cover sealing
(order no.: 10059058)



XCTB 61.35**Plug-in current transformers****Dimensions:**

Bus bar 1: 63 x 10 mm
 Bus bar 2: 50 x 30 mm
 Circular conductor: 43.7 mm
 Installation width: 95 mm
 Installation height: 114.86 mm
 Overall installation depth: 52 mm

Technical data:

Therm. nominal continuous current I_{cth} : $1.2 \times I_N$
 Therm. nominal short-time current I_{th} : $60 \times I_N$, 1 s
 Max. operating voltage U_m : 1.2 kV, U_{rms}
 Insulation test voltage: 6 kV, U_{rms} , 50 Hz, 1 min
Lightning impulse voltage: 12 kV, 1.2/50 μ s
 Nominal frequency: 50/60 Hz
 Technical standards applied: DIN EN 61869, Part 1 + 2
 Harmonic measurements with load 0.2 VA – Sr pf1
 Measuring accuracy up to 20 kHz: $\epsilon \leq 2\% | \Delta\phi \leq 2^\circ$ @ 0.05–10 kHz
 $\epsilon \leq 3\% | \Delta\phi \leq 3^\circ$ @ 10–20 kHz

Ordering table for XCTB 61.35 with secondary current 5 A

Secondary current		5 A				
Primary current [A]	Rated power [VA]	Accuracy class				
		1	0.5	0.5S	0.2	0.2S
		Order no.	Order no.	Order no.	Order no.	Order no.
200	1.5		10051-0314	10051-0334	10051-0353	
	2.5	10051-0301	10051-0315	10051-0335	10051-0354	
250	1.5		10051-0316	10051-0336	10051-0355	
	2.5		10051-0317	10051-0337	10051-0356	
300	5	10051-0302	10051-0318	10051-0338		
	2.5		10051-0319	10051-0339	10051-0357	10051-0368
400	5	10051-0303	10051-0320	10051-0340	10051-0358	
	2.5		10051-0321	10051-0341	10051-0359	10051-0369
500	5	10051-0304	10051-0322	10051-0342	10051-0360	
	2.5		10051-0323	10051-0343	10051-0361	10051-0370
600	5	10051-0305	10051-0324	10051-0344	10051-0362	10051-0371
	2.5		10051-0325	10051-0345	10051-0363	10051-0372
750	5	10051-0306	10051-0326	10051-0346	10051-0364	10051-0373
	5		10051-0327	10051-0347	10051-0365	10051-0374
800	5	10051-0308	10051-0328	10051-0348	10051-0366	
1000	5	10051-0309	10051-0329	10051-0349	10051-0367	
1200	5	10051-0310	10051-0330	10051-0350		
1250	5	10051-0311	10051-0331			
1500	5	10051-0312	10051-0332	10051-0352		
1600	5	10051-0313	10051-0333			

Ordering table for XCTB 61.35 with secondary current 1 A

Secondary current		1 A				
Primary current [A]	Rated power [VA]	Accuracy class				
		1	0.5	0.5S	0.2	0.2S
		Order no.	Order no.	Order no.	Order no.	Order no.
200	1.5		10051-2314	10051-2334	10051-2353	
	2.5	10051-2301	10051-2315	10051-2335	10051-2354	
250	1.5		10051-2316	10051-2336	10051-2355	10051-2371
	2.5		10051-2317	10051-2337	10051-2356	
	5	10051-2302	10051-2318	10051-2338		
300	2.5		10051-2319	10051-2339	10051-2357	10051-2372
	5	10051-2303	10051-2320	10051-2340	10051-2358	
400	2.5		10051-2321	10051-2341	10051-2359	10051-2373
	5	10051-2304	10051-2322	10051-2342	10051-2360	
500	2.5		10051-2323	10051-2343	10051-2361	10051-2374
	5	10051-2305	10051-2324	10051-2344	10051-2362	10051-2375
600	2.5		10051-2325	10051-2345	10051-2363	10051-2376
	5	10051-2306	10051-2326	10051-2346	10051-2364	10051-2377
750	5	10051-2307	10051-2327	10051-2347	10051-2365	10051-2378
800	5	10051-2308	10051-2328	10051-2348	10051-2366	
1000	5	10051-2309	10051-2329	10051-2349	10051-2367	
1200	5	10051-2310	10051-2330	10051-2350	10051-2368	
1250	5	10051-2311	10051-2331	10051-2351	10051-2369	
1500	5	10051-2312	10051-2332	10051-2352	10051-2370	
1600	5	10051-2313	10051-2333			

Accessories

Quick-fix (order no.: 10055021)

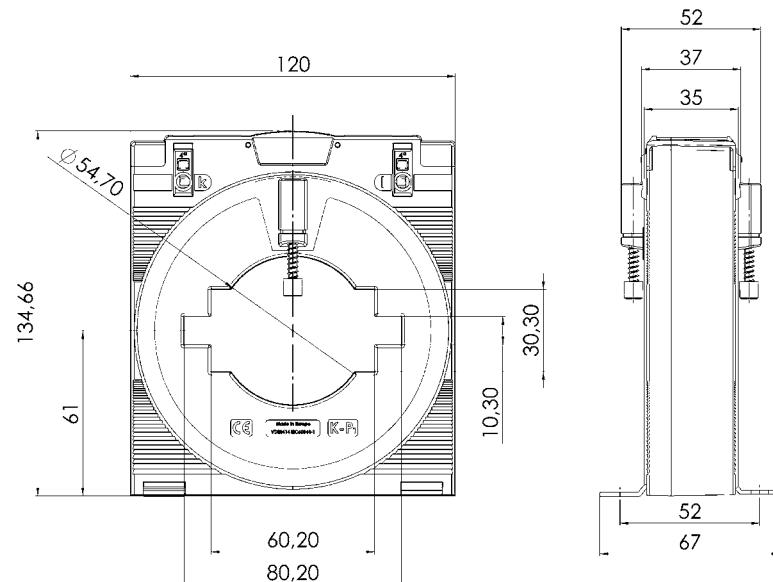


Cover sealing
(order no.: 10059059)



XCTB 81.35

Plug-in current transformers



Dimensions:

Bus bar 1: 80 x 10 mm
 Bus bar 2: 60 x 30 mm
 Circular conductor: 54.7 mm
 Installation width: 120 mm
 Installation height: 134.66 mm
 Overall installation depth: 52 mm

Technical data:

Therm. nominal continuous current I_{cth} : $1.2 \times I_N$
 Therm. nominal short-time current I_{th} : $60 \times I_N$, 1 s (max. 100 kA)
 Max. operating voltage U_m : 1.2 kV, U_{rms}
 Insulation test voltage: 6 kV, U_{rms} , 50 Hz, 1 min
Lightning impulse voltage: 12 kV, 1.2/50 μ s
 Nominal frequency: 50/60 Hz
 Technical standards applied: DIN EN 61869, Part 1 + 2
 Harmonic measurements with load 0.2 VA – Sr pf1
 Measuring accuracy up to 20 kHz: $\epsilon \leq 2\% | \Delta\phi \leq 2^\circ @ 0.05-10 \text{ kHz}$
 $\epsilon \leq 3\% | \Delta\phi \leq 3^\circ @ 10-20 \text{ kHz}$

Ordering table for XCTB 81.35 with secondary current 5 A

Secondary current		5 A				
Primary current [A]	Rated power [VA]	Accuracy class				
		1	0.5	0.5S	0.2	0.2S
400	2.5		10051-0411	10051-0426	10051-0440	
	5	10051-0401				
500	2.5		10051-0412	10051-0427	10051-0441	10051-0454
	5	10051-0402	10051-0413			
600	2.5		10051-0414	10051-0428	10051-0442	10051-0455
	5	10051-0403	10051-0415	10051-0429	10051-0443	10051-0456
750	2.5		10051-0416	10051-0430	10051-0444	10051-0457
	5	10051-0404	10051-0417	10051-0431	10051-0445	10051-0458
800	2.5		10051-0418	10051-0432	10051-0446	10051-0459
	5	10051-0405	10051-0419	10051-0433	10051-0447	10051-0460
1000	5	10051-0406	10051-0420	10051-0434	10051-0448	10051-0461
1200	5	10051-0407	10051-0421	10051-0435	10051-0449	10051-0462
1250	5	10051-0408	10051-0422	10051-0436	10051-0450	10051-0463
1500	5	10051-0409	10051-0423	10051-0437	10051-0451	10051-0464
1600	5	10051-0410	10051-0424	10051-0438	10051-0452	10051-0465
2000	5		10051-0425	10051-0439	10051-0453	10051-0466

Ordering table for XCTB 81.35 with secondary current 1 A

Secondary current		A				
Primary current [A]	Rated power [VA]	Accuracy class				
		1	0.5	0.5S	0.2	0.2S
		Order 1 no.	Order no.	Order no.	Order no.	Order no.
400	2.5		10051-2411	10051-2426	10051-2441	
	5	10051-2401				
500	2.5		10051-2412	10051-2427	10051-2442	10051-2455
	5	10051-2402	10051-2413	10051-2428		
600	2.5		10051-2414	10051-2429	10051-2443	10051-2456
	5	10051-2403	10051-2415	10051-2430	10051-2444	10051-2457
750	2.5		10051-2416	10051-2431	10051-2445	10051-2458
	5	10051-2404	10051-2417	10051-2432	10051-2446	10051-2459
800	2.5		10051-2418	10051-2433	10051-2447	10051-2460
	5	10051-2405	10051-2419	10051-2434	10051-2448	10051-2461
1000	5	10051-2406	10051-2420	10051-2435	10051-2449	10051-2462
1200	5	10051-2407	10051-2421	10051-2436	10051-2450	10051-2463
1250	5	10051-2408	10051-2422	10051-2437	10051-2451	10051-2464
1500	5	10051-2409	10051-2423	10051-2438	10051-2452	10051-2465
1600	5	10051-2410	10051-2424	10051-2439	10051-2453	10051-2466
2000	5		10051-2425	10051-2440	10051-2454	10051-2467

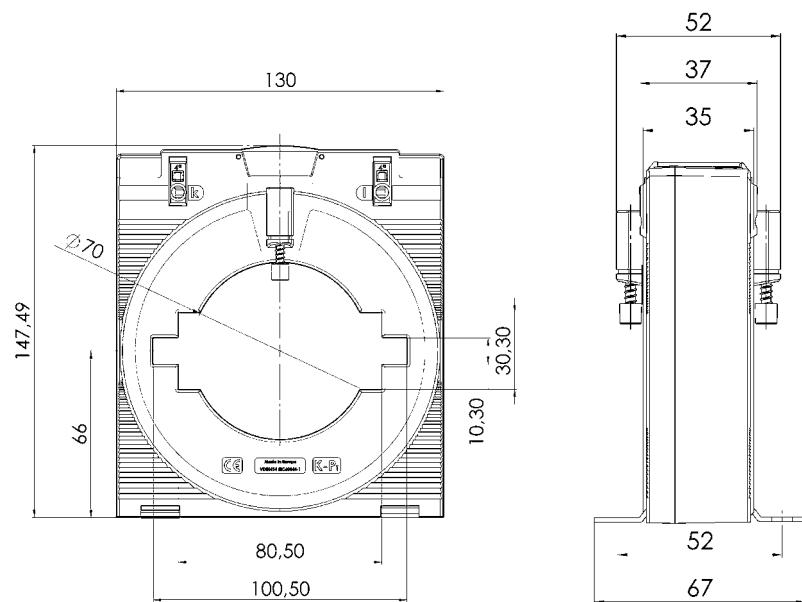
Accessories

Quick-fix (order no.: 10055021)



Cover sealing
(order no.: 10059059)



XCTB 101.35**Plug-in current transformers****Dimensions:**

Bus bar 1: 100 x 10 mm
 Bus bar 2: 80 x 30 mm
 Circular conductor: 70 mm
 Installation width: 130 mm
 Installation height: 147.49 mm
 Overall installation depth: 52 mm

Technical data:

Therm. nominal continuous current I_{cth} : $1.2 \times I_N$
 Therm. nominal short-time current I_{th} : $60 \times I_N$, 1 s (max. 100 kA)
 Max. operating voltage U_m : 1.2 kV, U_{rms}
 Insulation test voltage: 6 kV, U_{rms} , 50 Hz, 1 min
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 Technical standards applied: DIN EN 61869, Part 1 + 2
 Harmonic measurements with load 0.2 VA – Sr pf1
 Measuring accuracy up to 20 kHz: $\epsilon \leq 2\% | \Delta\phi \leq 2^\circ @ 0.05-10 \text{ kHz}$
 $\epsilon \leq 3\% | \Delta\phi \leq 3^\circ @ 10-20 \text{ kHz}$

Ordering table for XCTB 101.35 with secondary current 5 A

Secondary current		5 A				
Primary current [A]	Rated power [VA]	Accuracy class				
		1	0.5	0.5S	0.2	0.2S
		Order no.	Order no.	Order no.	Order no.	Order no.
400	2.5		10051-0508			
	5	10051-0501				
500	2.5		10051-0509			
	5	10051-0502	10051-0510			
600	2.5		10051-0511	10051-0523		
	5		10051-0512			
750	2.5		10051-0513	10051-0524		
	5	10051-0503	10051-0514	10051-0525		
800	2.5		10051-0515	10051-0526		
	5	10051-0504	10051-0516	10051-0527		
1000	5	10051-0505	10051-0517	10051-0528	10051-0534	
1200	5	10051-0506	10051-0518	10051-0529	10051-0535	10051-0540
1250	5	10051-0507	10051-0519	10051-0530	10051-0536	10051-0541
1500	5		10051-0520	10051-0531	10051-0537	10051-0542
1600	5		10051-0521	10051-0532	10051-0538	10051-0543
2000	5		10051-0522	10051-0533	10051-0539	10051-0544

Ordering table for XCTB 101.35 with secondary current 1 A

Secondary current		1 A				
Primary current [A]	Rated power [VA]	Accuracy class				
		1	0.5	0.5S	0.2	0.2S
400	2.5	10051-2508				
	5	10051-2501				
500	2.5	10051-2509	10051-2523			
	5	10051-2502	10051-2510			
600	2.5	10051-2511	10051-2524			
	5	10051-2512	10051-2525			
750	2.5	10051-2513	10051-2526			
	5	10051-2503	10051-2514	10051-2527		
800	2.5	10051-2515	10051-2528	10051-2536		
	5	10051-2504	10051-2516	10051-2529		
1000	5	10051-2505	10051-2517	10051-2530	10051-2537	10051-2543
1200	5	10051-2506	10051-2518	10051-2531	10051-2538	10051-2544
1250	5	10051-2507	10051-2519	10051-2532	10051-2539	10051-2545
1500	5		10051-2520	10051-2533	10051-2540	10051-2546
1600	5		10051-2521	10051-2534	10051-2541	10051-2547
2000	5		10051-2522	512535	10051-2542	10051-2548

Accessories

Quick-fix (order no.: 10055021)



Cover sealing
(order no.: 10059059)





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