

# ABB 1LDE000122 transformers datasheet

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ABB is committed to developing all its products to meet ever-more-demanding environmental and efficiency requirements.

Our ultra-efficient dry-type transformers have been greatly improved in terms of efficiency, specifically tailored to the particular application identified, for customers with a commitment to environmental protection and cost awareness.

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## Technical data EcoDry dry-type transformers

### Ultra-efficient dry-type transformers – a safe and economical solution

ABB is committed to developing all its products to meet ever-more-demanding environmental and efficiency requirements. Our ultra-efficient dry-type transformers have been greatly improved in terms of efficiency, specifically tailored to the particular application identified, for customers with a commitment to environmental protection and cost-awareness.



Power and productivity  
for a better world™



### EcoDry: the ultra-efficient dry-type transformer

We offer the various technologies involved to suit the customer's own particular application: for distribution transformers with a low average load the dry-type transformer EcoDry<sup>Basic</sup>, and for those with a high to very high load profile, the EcoDry<sup>99Plus</sup>. EcoDry<sup>Ultra</sup> is used when periods of weak and high load alternate quite often, or the average load is in the medium range.

State-of-the-art materials and top-quality components, e.g. amorphous metal as core material for EcoDry<sup>Basic</sup> and EcoDry<sup>Ultra</sup> are established. This metal has particular physical properties which provide a reduction of load losses by up to 70 percent and therefore increases efficiency.

Rating figures, that are not listed in the following tables, are available on request.

#### Voltage range 12 kV (IP00)

EcoDry <sup>Basic</sup>							
Power	u <sub>k</sub>	P <sub>0</sub>	P <sub>k</sub> at	Length	Width	Height	Weight
[kVA]	[%]	[W]	120°C[W]	[mm]	[mm]	[mm]	[kg]
100	4.0	140	2,000	1,050	800	1,270	970
250	4.0	240	3,500	1,110	800	1,300	1,450
400	4.0	320	4,900	1,250	800	1,400	2,040
630	4.0	430	5,400	1,650	840	1,870	2,900
800	6.0	490	7,640	1,590	800	1,790	3,000
1,000	6.0	530	9,500	1,580	980	1,980	3,300
1,250	6.0	600	12,000	1,650	980	2,170	4,100
1,600	6.0	810	14,000	1,770	980	2,070	4,700
2,000	6.0	1,020	18,000	1,860	1,020	2,460	5,400
2,500	6.0	1,220	22,000	1,920	1,270	2,650	6,700
3,150	6.0	1,600	26,000	1,980	1,270	2,800	8,100
4,000	6.0	1,800	30,000	2,110	1,350	3,350	9,690

EcoDry <sup>99Plus</sup>							
Power	u <sub>k</sub>	P <sub>0</sub>	P <sub>k</sub> at	Length	Width	Height	Weight
[kVA]	[%]	[W]	120°C[W]	[mm]	[mm]	[mm]	[kg]
630	4.0	1,150	5,100	1,410	860	1,850	2,350
800	6.0	1,350	5,600	1,620	900	1,710	2,550
1,000	6.0	1,550	6,790	1,680	990	2,040	3,400
1,250	6.0	1,850	8,630	1,770	1,000	1,980	3,850
1,600	6.0	2,250	10,000	1,890	1,020	2,120	4,900
2,000	6.0	2,800	13,230	1,890	1,080	2,310	5,400
2,500	6.0	3,150	16,680	1,980	1,500	2,500	6,750
3,150	6.0	3,600	21,280	2,160	1,500	2,600	8,350
4,000	6.0	4,300	24,500	2,300	1,600	3,110	9,990

EcoDry <sup>Ultra</sup>							
Power	u <sub>k</sub>	P <sub>0</sub>	P <sub>k</sub> at	Length	Width	Height	Weight
[kVA]	[%]	[W]	120°C[W]	[mm]	[mm]	[mm]	[kg]
630	4.0	450	5,100	1,640	840	1,930	3,000
800	6.0	500	5,600	1,680	770	1,790	3,300
1,000	6.0	560	7,250	1,650	980	2,090	3,800
1,250	6.0	710	8,630	1,770	980	2,170	4,500
1,600	6.0	880	10,700	1,830	980	2,220	5,300
2,000	6.0	1,040	13,920	1,860	1,020	2,460	6,100
2,500	6.0	1,250	17,250	2,040	1,270	2,650	7,400
3,150	6.0	1,650	21,850	2,200	1,270	2,750	9,200
4,000	6.0	1,950	24,500	2,330	1,350	3,290	11,010

#### Voltage range 12 kV (IP23)

EcoDry <sup>Basic</sup>							
Power	u <sub>k</sub>	P <sub>0</sub>	P <sub>k</sub> at	Length	Width	Height	Weight
[kVA]	[%]	[W]	120°C[W]	[mm]	[mm]	[mm]	[kg]
100	4.0	140	2,000	Figures are available on request			
250	4.0	240	3,500	Figures are available on request			
400	4.0	320	4,900	Figures are available on request			
630	4.0	430	5,400	2,200	1,620	2,200	3,400
800	6.0	490	7,640	2,200	1,620	2,200	3,500
1,000	6.0	530	9,500	2,440	1,740	2,600	3,900
1,250	6.0	600	12,000	2,440	1,740	2,600	4,700
1,600	6.0	810	14,000	2,610	1,880	2,870	5,500
2,000	6.0	1,020	18,000	2,610	1,880	2,870	6,200
2,500	6.0	1,220	22,000	2,950	2,000	3,150	7,600
3,150	6.0	1,600	26,000	2,950	2,000	3,150	8,900
4,000	6.0	1,800	30,000	3,140	2,130	3,770	10,650

EcoDry <sup>99Plus</sup>							
Power	u <sub>k</sub>	P <sub>0</sub>	P <sub>k</sub> at	Length	Width	Height	Weight
[kVA]	[%]	[W]	120°C[W]	[mm]	[mm]	[mm]	[kg]
630	4.0	1,150	5,100	2,080	1,580	2,150	2,800
800	6.0	1,350	5,600	2,080	1,580	2,150	3,000
1,000	6.0	1,550	6,790	2,330	1,580	2,400	3,850
1,250	6.0	1,850	8,630	2,330	1,580	2,400	4,300
1,600	6.0	2,250	10,000	2,330	1,780	2,700	5,500
2,000	6.0	2,800	13,230	2,330	1,780	2,740	5,950
2,500	6.0	3,150	16,680	2,580	1,780	3,040	7,400
3,150	6.0	3,600	21,280	2,580	1,780	3,100	8,950
4,000	6.0	4,300	24,500	2,740	1,890	3,710	10,710

EcoDry <sup>Ultra</sup>							
Power	u <sub>k</sub>	P <sub>0</sub>	P <sub>k</sub> at	Length	Width	Height	Weight
[kVA]	[%]	[W]	120°C[W]	[mm]	[mm]	[mm]	[kg]
630	4.0	450	5,100	2,200	1,620	2,200	3,500
800	6.0	500	5,600	2,200	1,620	2,200	3,800
1,000	6.0	560	7,250	2,440	1,740	2,600	4,300
1,250	6.0	710	8,630	2,440	1,740	2,600	5,100
1,600	6.0	880	10,700	2,610	1,880	2,870	6,100
2,000	6.0	1,040	13,920	2,610	1,880	2,870	6,800
2,500	6.0	1,250	17,250	2,950	2,000	3,150	8,300
3,150	6.0	1,650	21,850	2,950	2,000	3,150	10,100
4,000	6.0	1,950	24,500	3,140	2,130	3,770	12,100



### Voltage range 24 kV (IP00)

EcoDry <sup>Basic</sup>							
Power	$u_k$	$P_0$	$P_k$ at	Length	Width	Height	Weight
[kVA]	[%]	[W]	120°C[W]	[mm]	[mm]	[mm]	[kg]
100	4.0	180	1,100	1,320	800	1,270	1,320
250	4.0	320	3,900	1,350	800	1,300	1,860
400	4.0	400	4,900	1,500	800	1,500	2,530
630	4.0	560	5,400	1,650	860	2,030	3,700
800	6.0	570	7,640	1,650	860	2,050	3,700
1,000	6.0	730	9,200	1,910	980	2,230	4,300
1,250	6.0	810	12,000	1,860	980	2,380	4,800
1,600	6.0	1,020	14,000	1,920	980	2,580	5,800
2,000	6.0	1,250	19,000	2,010	1,020	2,660	6,800
2,500	6.0	1,400	22,000	2,010	1,270	2,660	7,300
3,150	7.0	1,650	26,000	2,250	1,270	2,750	8,800
4,000	7.0	2,100	31,000	2,390	1,350	3,290	10,530

EcoDry <sup>99Plus</sup>							
Power	$u_k$	$P_0$	$P_k$ at	Length	Width	Height	Weight
[kVA]	[%]	[W]	120°C[W]	[mm]	[mm]	[mm]	[kg]
630	4.0	1,250	5,100	1,560	1,000	1,900	3,000
800	6.0	1,450	5,950	1,740	1,020	1,900	3,250
1,000	6.0	1,700	7,360	1,950	1,200	2,120	4,000
1,250	6.0	2,200	8,860	2,010	1,140	2,280	4,850
1,600	6.0	2,450	10,700	2,050	1,200	2,300	5,200
2,000	6.0	3,000	13,800	2,100	1,250	2,400	5,500
2,500	6.0	3,500	16,680	2,130	1,600	2,510	6,500
3,150	7.0	4,300	23,800	2,280	1,600	2,610	7,100
4,000	7.0	5,100	28,000	2,420	1,700	3,130	8,500

EcoDry <sup>Ultra</sup>							
Power	$u_k$	$P_0$	$P_k$ at	Length	Width	Height	Weight
[kVA]	[%]	[W]	120°C[W]	[mm]	[mm]	[mm]	[kg]
630	4.0	570	5,200	1,680	860	2,030	3,800
800	6.0	570	6,200	1,680	860	2,050	3,800
1,000	6.0	760	8,050	1,950	980	2,230	4,400
1,250	6.0	820	9,080	1,920	980	2,380	5,100
1,600	6.0	1,050	10,810	2,040	980	2,430	6,100
2,000	6.0	1,250	14,490	2,070	1,020	2,660	7,100
2,500	6.0	1,650	17,250	2,160	1,270	2,700	7,800
3,150	7.0	1,850	21,850	2,430	1,270	2,900	10,300
4,000	7.0	2,100	24,500	2,580	1,350	3,470	12,330

### Voltage range 24 kV (IP23)

EcoDry <sup>Basic</sup>							
Power	$u_k$	$P_0$	$P_k$ at	Length	Width	Height	Weight
[kVA]	[%]	[W]	120°C[W]	[mm]	[mm]	[mm]	[kg]
100	4.0	180	1,100	Figures are available on request			
250	4.0	320	3,900	Figures are available on request			
400	4.0	400	4,900	Figures are available on request			
630	4.0	560	5,400	2,200	1,620	2,200	4,200
800	6.0	570	7,640	2,200	1,620	2,200	4,200
1,000	6.0	730	9,200	2,440	1,740	2,600	4,900
1,250	6.0	810	12,000	2,440	1,740	2,600	5,400
1,600	6.0	1,020	14,000	2,610	1,880	2,870	6,500
2,000	6.0	1,250	19,000	2,610	1,880	2,870	7,500
2,500	6.0	1,400	22,000	2,950	2,000	3,150	8,200
3,150	7.0	1,650	26,000	2,950	2,000	3,150	9,700
4,000	7.0	2,100	31,000	3,140	2,130	3,770	11,610

EcoDry <sup>99Plus</sup>							
Power	$u_k$	$P_0$	$P_k$ at	Length	Width	Height	Weight
[kVA]	[%]	[W]	120°C[W]	[mm]	[mm]	[mm]	[kg]
630	4.0	1,250	5,100	2,010	1,830	2,100	3,450
800	6.0	1,450	5,950	2,190	1,880	2,100	3,700
1,000	6.0	1,700	7,360	2,400	1,930	2,300	4,550
1,250	6.0	2,200	8,860	2,460	1,930	2,500	5,400
1,600	6.0	2,450	10,700	2,500	1,980	2,550	5,800
2,000	6.0	3,000	13,800	2,610	2,030	2,900	6,200
2,500	6.0	3,500	16,680	3,100	2,030	3,100	7,250
3,150	7.0	4,300	23,800	2,730	2,030	3,100	8,000
4,000	7.0	5,100	28,000	2,900	2,160	3,710	9,570

EcoDry <sup>Ultra</sup>							
Power	$u_k$	$P_0$	$P_k$ at	Length	Width	Height	Weight
[kVA]	[%]	[W]	120°C[W]	[mm]	[mm]	[mm]	[kg]
630	4.0	570	5,200	2,200	1,620	2,200	4,300
800	6.0	570	6,200	2,200	1,620	2,200	4,200
1,000	6.0	760	8,050	2,440	1,740	2,600	5,000
1,250	6.0	820	9,080	2,440	1,740	2,600	5,700
1,600	6.0	1,050	10,810	2,610	1,880	2,870	6,800
2,000	6.0	1,250	14,490	2,610	1,880	2,870	7,800
2,500	6.0	1,650	17,250	2,950	2,000	3,150	8,700
3,150	7.0	1,850	21,850	2,950	2,000	3,150	11,100
4,000	7.0	2,100	24,500	3,140	2,130	3,770	13,280

### References for energy-losses and transformer efficiency

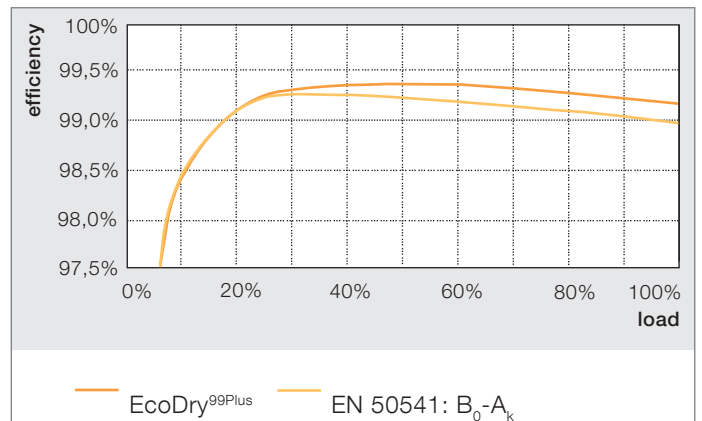
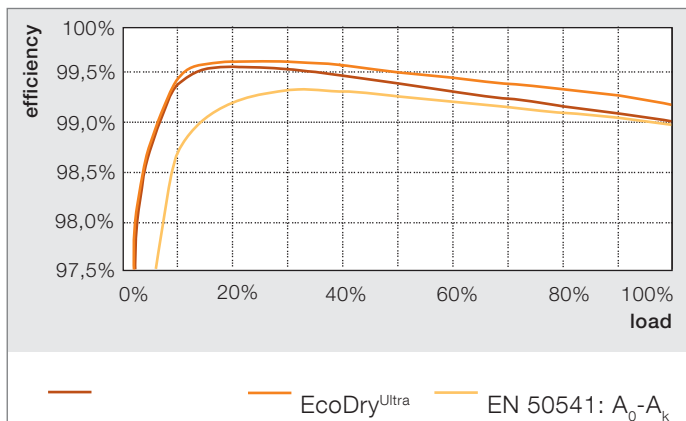
The CENELEC HD 538 documents were in the past providing reference values for no-load and load loss of dry-type transformers. In 2010, CENELEC EN 50541-1 was approved and supersedes HD 538. EN 50541 contains for each rating three classes of no-load loss ( $A_0$ ,  $B_0$ ,  $C_0$ ) and two classes of load loss ( $A_k$ ,  $B_k$ ), with the A class always having the lowest loss. HD 538 corresponds approximately to  $C_0$ - $B_k$ . EcoDry<sup>Basic</sup> and EcoDry<sup>Ultra</sup> provide no-load loss values which are only about half of  $A_0$ . Load loss of EcoDry<sup>99Plus</sup> and EcoDry<sup>Ultra</sup> is significantly below  $A_k$ . IEC has established a working group for the preparation of an IEC 60076 standard for energy efficiency of distribution transformers.

The efficiency of a transformer is given by the ratio of output to input power. It depends on the load factor  $\alpha$ , the rated power  $S$ , the no-load loss  $P_0$  and the load loss  $P_k$ :

$$\eta = \frac{\alpha * S}{\alpha * S + P_0 + \alpha^2 * P_k}$$

As the graph show, the best efficiency levels for the various types of transformer are dependent on the load involved, and thus on the application concerned.

### Efficiency comparison for 1,000 kVA transformers



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