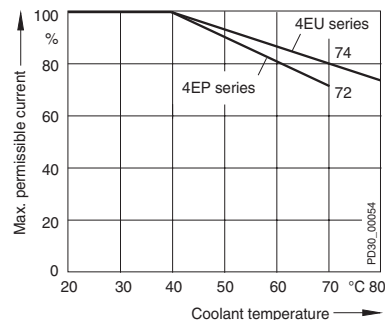


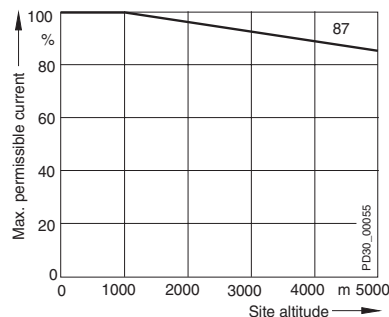
General

Deviations of rated values at site altitudes > 1000 m

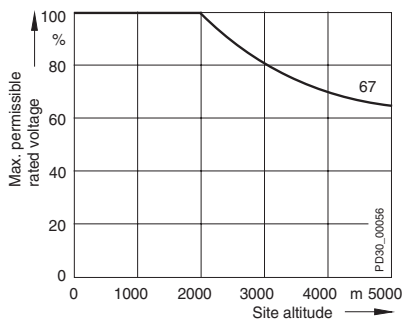
Reduction of the rated voltage and rated current, depending on the site altitude and coolant temperature



Deviation of the permissible direct current of rated direct current I_{dn} , or permissible alternating current of rated alternating current I_n (at coolant temperatures $\neq 40^\circ\text{C}$)
Characteristic curve 74 applies to reactors 4EU, 4ET, 4PK
Characteristic curve 72 applies to reactors 4EP, 4EM, 4EF11



Deviation of permissible direct current of rated direct current I_{dn} , or permissible alternating current of rated alternating current I_n (at site altitudes > 1000 m above sea level)



Reduction of rated voltage for insulation (at site altitudes > 2000 m above sea level)

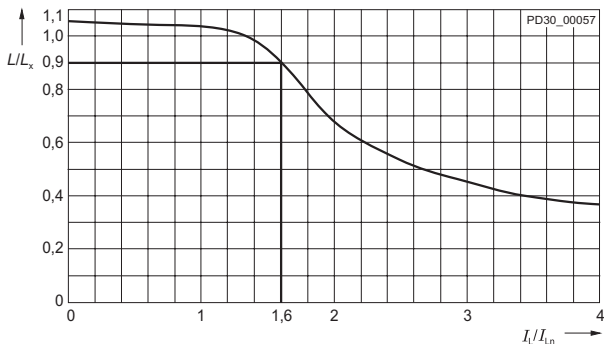
Inductance curve

Commutating reactors and mains reactors

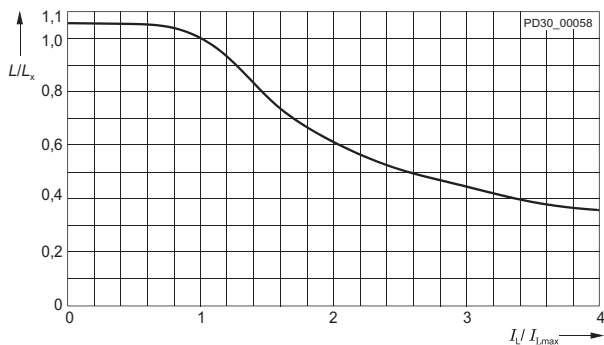
Commutating reactors and mains reactors differ greatly with regard to the inductance curve. The inductance is almost constant through to the rated current I_{Ln} .

- Mains reactors still have 90% of their rated inductance at a 1.6-fold rated current I_{Ln} .
- Commutating reactors have a residual inductance of 60% at a 2.0-fold rated current I_{Ln} .

Typical inductance curves over the reactor current are shown in the following illustrations:



Typical curve of the inductance of a **mains reactor** over the reactor current



Typical curve of the inductance of a **commutating reactor** over the reactor current

Voltage drop ΔU or reference voltage drop u_D

In the case of **three-phase reactors**, the voltage drop ΔU per reactor phase when loaded with the maximum continuous thermal current I_{thmax} and line frequency $f = 50$ Hz or 60 Hz.

The percent voltage drop u_D can be calculated using the following formula:

For converter connection B6

$$u_D = \frac{\Delta U \times 100 \times \sqrt{3}}{U_N} \quad \text{in \%}$$

The inductance per reactor phase is as follows:

$$L_x = \frac{\Delta U}{I_{thmax} \times \omega}$$

$$\omega = 2 \pi \times f$$

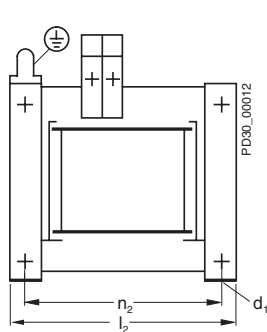
with f = line frequency (50 Hz or 60 Hz)

Recommended supply voltage U_N , reference voltage drop u_D and insulation rating

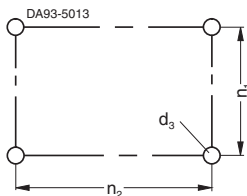
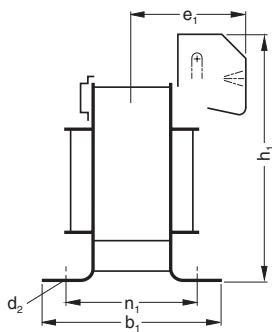
The "Selection and ordering data" table specifies a recommended supply voltage U_N for the reactors. The percent voltage drops u_D assigned to the reactors apply to the relevant recommended supply voltage U_N .

The rated voltage for the insulation specified in the "Selection and ordering data" table also allows the use of reactors at voltages that deviate from the recommended supply voltage U_N , but that are smaller or the same as the rated voltage of the insulation. The reference voltage drop u_D then changes and can be calculated using the formula shown in the Section "Voltage drop ΔU or reference voltage drop u_D ".

A reactor with the reference voltage drop u_D specified as a percent value has the same effect on the system as a transformer with the same u_K .



4EM ≤ 40 A



Mounting holes

Terminal 8WA9 200

(for $I_{dn} = 21$ A)

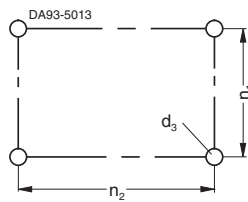
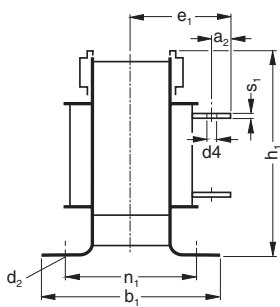
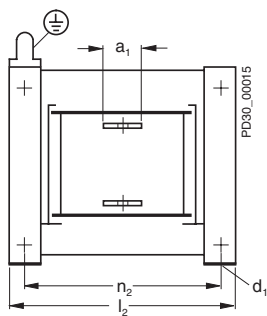
Cross-sections: solid: 0.5 mm² to 6 mm²
finely stranded: 0.5 mm² to 4 mm²

Terminal RKW110 or TRKSD10

(for $I_{dn} = 22$ A to 40 A)

Cross-sections: solid: 1 mm² to 16 mm²
finely stranded: 1 mm² to 10 mm²

Type	b ₁	d ₁	d ₂	d ₃	e ₁	h ₁	l ₂	n ₁	n ₂
Rated direct current $I_{dn} \leq 40$ A, with terminal connections, for user-defined arrangement of reactors									
4EM46	51	3.6	7	M3	54	85	61	39	50
4EM47	60	4.8	9	M4	55	89	67	45	55
4EM48	69	4.8	9	M4	57	98	79	53	65
4EM49	85	4.8	9	M4	66	103	85	69	70
4EM50	97	5.8	11	M5	67	111	97	77	80
4EM51	111	5.8	11	M5	74	111	97	91	80
4EM52	115	5.8	11	M5	71	131	121	92	100
4EM53	120	7.0	13	M6	69	151	151	92	125
4EM54	137	7.0	13	M6	78	151	151	109	125
4EM55	157	7.0	13	M6	90	151	151	135.5	125
4EM59	145	7.0	15	M6	84	176	167	118.5	145
4EM60	167	7.0	15	M6	94	176	167	138.5	145
4EM61	110	5.8	11	M5	74	118	106	92	87.5
4EM62	135	5.8	11	M5	81	131	121	112	100

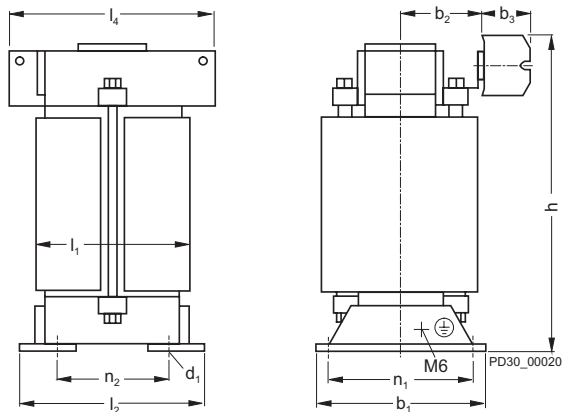


4EM > 40 A

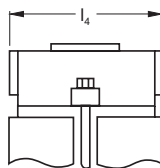
Mounting holes

Type	b ₁	d ₁	d ₂	d ₃	e ₁ (up to 200 A)	e ₁ (up to 400 A)	h ₁	l ₂	n ₁	n ₂
Rated direct current $I_{dn} > 40$ A with flat terminations, for user-defined arrangement of reactors										
4EM46	51	3.6	7	M3	58	63	59	61	39	50
4EM47	60	4.8	9	M4	61	66	64	67	45	55
4EM48	69	4.8	9	M4	65	70	73	79	53	65
4EM49	85	4.8	9	M4	74	79	78	85	69	70
4EM50	97	5.8	11	M5	78	83	87.5	97	77	80
4EM51	111	5.8	11	M5	85	90	87.5	97	91	80
4EM52	115	5.8	11	M5	87	92	109	121	92	100
4EM53	120	7.0	13	M6	90	95	135	151	92	125
4EM54	137	7.0	13	M6	99	104	135	151	109	125
4EM55	157	7.0	13	M6	115	120	135	151	135.5	125
4EM59	145	7.0	15	M6	108	113	155	167	118.5	145
4EM60	167	7.0	15	M6	120	125	155	167	118.5	145
4EM61	110	5.8	11	M5	87	92	96.5	106	92	87.5
4EM62	135	5.8	11	M5	97	102	109	121	112	100

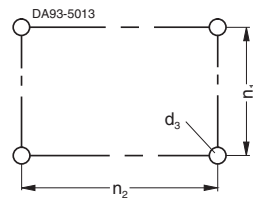
Rated current up to	a ₁	a ₂	d ₄	s ₁
Flat termination				
100 A	16	8	7	2.5
200 A	20	10	9	3.0
400 A	25	12.5	11	5.0



Version **4ET36 to 4ET47**
(shown without terminals)



Version **4ET25 to 4ET30**
(shown without terminals)



Mounting holes

Terminal **8WA1 011-1DG11**

(for $I_{dn} = 21\text{ A}$) $b_3 = 30\text{ mm}$

Cross-sections: solid: 0.5 mm^2 to 6 mm^2
 finely stranded: 0.5 mm^2 to 4 mm^2

Terminal **8WA1 011-1DH11**

(for $I_{dn} = 22$ to 27 A) $b_3 = 30\text{ mm}$

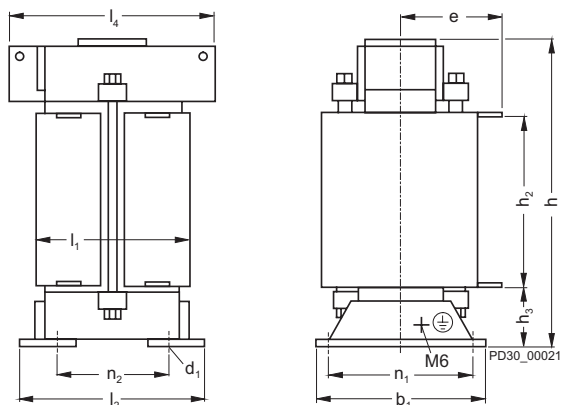
Cross-sections: solid: 0.75 mm^2 to 10 mm^2
 finely stranded: 1.5 mm^2 to 6 mm^2

Terminal **8WA1 204**

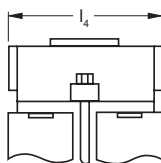
(for $I_{dn} = 20$ to 50 A) $b_3 = 38\text{ mm}$

Cross-sections: solid: 1.0 mm^2 to 16 mm^2
 stranded: 10 mm^2 to 25 mm^2
 finely stranded: 2.5 mm^2 to 16 mm^2

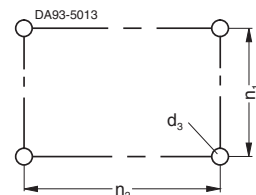
Type	b_1	b_2	d_1	d_2	d_3	h	l_1	l_2	l_4	n_1	n_2	b_3
Rated direct current $I_{dn} \leq 50\text{ A}$, with terminal connections, for arrangement on horizontal surfaces												
4ET25	128	73	7	13	M6	220	140	131	123	94	100	See terminals above
4ET27	146	77	10	18	M8	250	164	148	141	101	112	
4ET30	155	80	10	18	M8	280	180	165	159	118	124	
4ET36	169	85	10	18	M8	335	220	195	241	138	144	
4ET39	174	82	12	18	M10	385	260	227	271	141	176	
4ET43	194	87	15	22	M12	435	290	257	301	155	196	
4ET45	221	101	15	22	M12	435	290	257	301	182	196	
4ET47	251	116	15	22	M12	435	290	257	301	212	196	



Version **4ET36** to **4ET47**

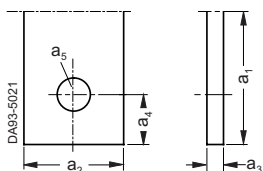


Version **4ET25** to **4ET30**



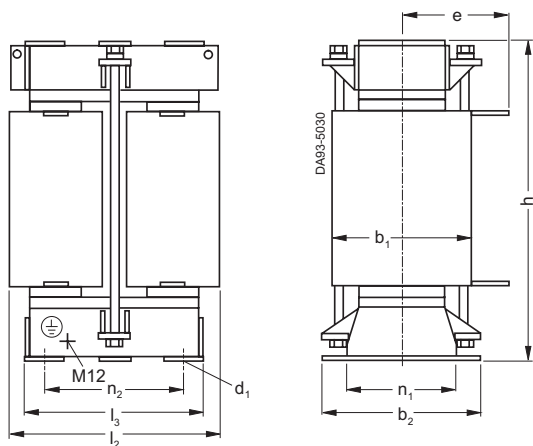
Mounting holes

Type	b ₁	d ₁	d ₂	d ₃	h	h ₂	h ₃	l ₁	l ₂	l ₄	n ₁	n ₂	e
Rated direct current $I_{dn} > 50$ A, for arrangement on horizontal surfaces													
4ET25	128	7	13	M6	220	124	54	140	131	123	94	100	95
4ET27	146	10	18	M8	250	142	60	164	148	141	101	112	102
4ET30	155	10	18	M8	280	160	66	180	165	159	118	124	104
4ET36	169	10	18	M8	335	190	76	220	195	241	138	144	112
4ET39	174	12	18	M10	385	220	86	260	227	271	141	176	114
4ET43	194	15	22	M12	435	250	96	290	257	301	155	196	119
4ET45	221	15	22	M12	435	250	96	290	257	301	182	196	133
4ET47	251	15	22	M12	435	250	96	290	257	301	212	196	148

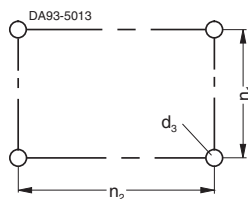


Rated current up to	a ₁	a ₂	a ₃	a ₄	a ₅
Flat termination					
200 A	35	20	3	10.0	9
400 A	35	25	5	12.5	11
630 A	40	30	6	15.0	11

Flat termination 4ET36 to 4ET47, 4ET25 to 4ET30

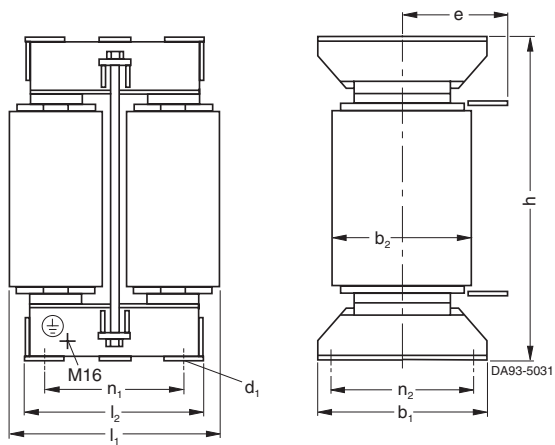


4ET51 to **4ET65**

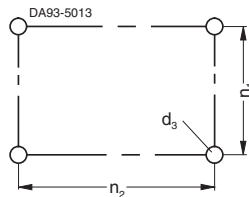


Mounting holes

Type	b ₁	b ₂	d ₁	d ₃	h	l ₂	l ₃	n ₁	n ₂	e
Rated direct current $I_{dn} > 50$ A, for arrangement on horizontal surfaces										
4ET51	267	210	13.5	M10	565	340	289	170	225	205
4ET52	280	223	13.5	M10	565	340	289	183	225	210
4ET53	295	238	13.5	M10	565	340	289	198	225	220
4ET54	295	248	16.0	M12	650	390	334	198	260	220
4ET55	310	263	16.0	M12	650	390	334	213	260	230
4ET56	330	283	16.0	M12	650	390	334	233	260	240
4ET58	330	293	16.0	M12	745	480	404	241	320	240
4ET59	350	313	16.0	M12	745	480	404	261	320	250
4ET60	375	338	16.0	M12	745	480	404	286	320	260
4ET62	405	318	22.0	M16	880	610	499	261	395	275
4ET63	430	343	22.0	M16	880	610	499	298	395	290
4ET64	460	373	22.0	M16	880	610	499	323	395	300
4ET65	490	403	22.0	M16	880	610	499	353	395	320

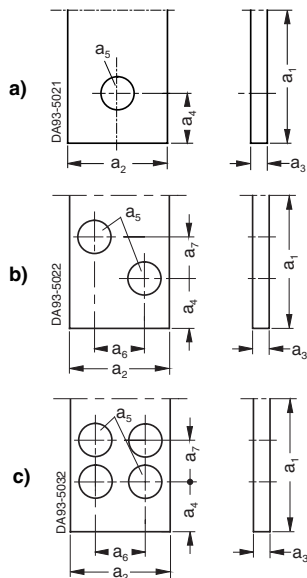


4ET72 to 4ET80



Mounting holes

Type	b ₁	b ₂	d ₁	d ₃	h	l ₁	l ₂	n ₁	n ₂	e
Rated direct current $I_{dn} > 50$ A, for arrangement on horizontal surfaces										
4ET72	520	550	24	—	965	710	560	420	440	270
4ET74	490	510	28	—	1135	850	670	530	390	270
4ET75	560	580	28	—	1135	850	670	530	460	290
4ET76	640	660	28	—	1135	850	670	530	540	330
4ET78	620	600	34	—	1340	990	790	650	480	290
4ET79	700	680	34	—	1340	990	790	650	560	330
4ET80	800	780	34	—	1340	990	790	650	660	380



Rated current up to	a ₁	a ₂	a ₃	a ₄	a ₅	a ₆	a ₇
a) Flat termination							
100 A	25	16	2.5	8.0	7	—	—
200 A	30	20	3.0	10.0	9	—	—
400 A	35	25	5.0	12.5	11	—	—
630 A	40	30	6.0	15.0	11	—	—
800 A	40	30	8.0	15.0	14	—	—
1000 A	50	40	8.0	20.0	14	—	—
b) Flat termination							
1250 A	60	50	8	14	14	22	22
1600 A	70	60	12	17	14	26	26
c) Flat termination							
2500 A	90	80	12	20	14	40	40