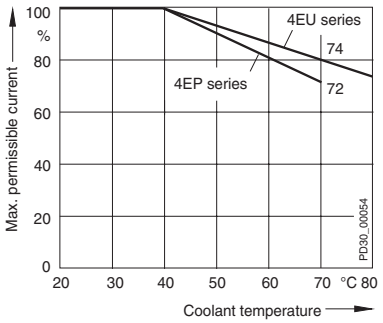
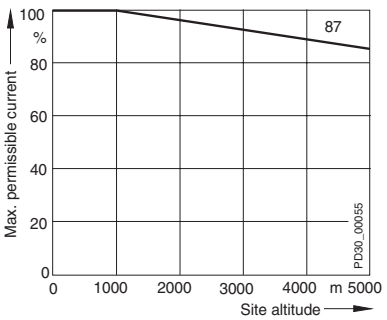
Deviations of rated values at site altitudes > 1000 m

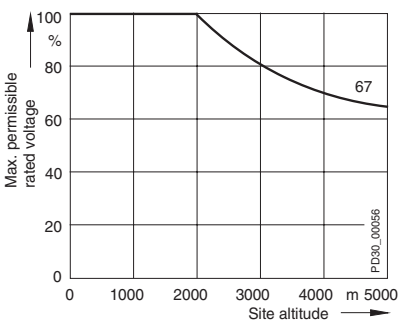
Reduction of the rated voltage and rated current, depending on the site altitude and coolant temperature



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 ≠ 40°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)

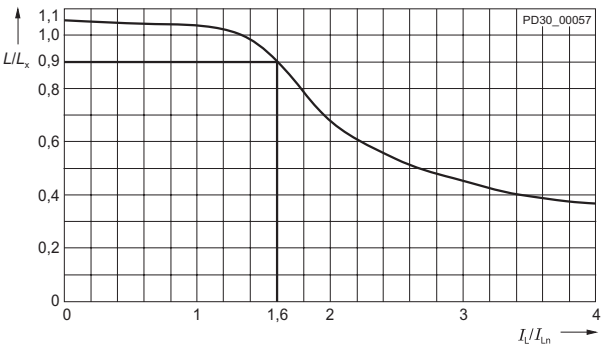
Inductance curve

Commutating reactors and mains reactors

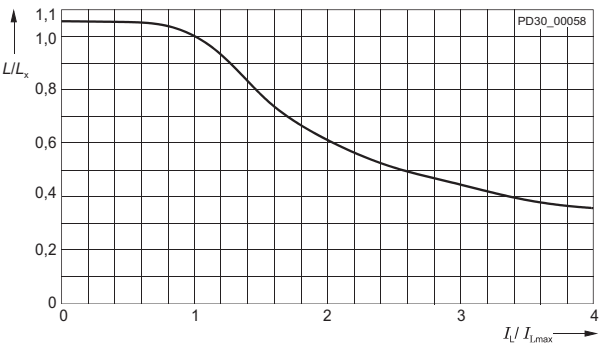
Commutating reactors and mains reactors differ greatly with regard to the inductance curve. The inductance is almost constant through to the rated current I_{Ln},

- 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:

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

$\omega = 2 \pi \times f$

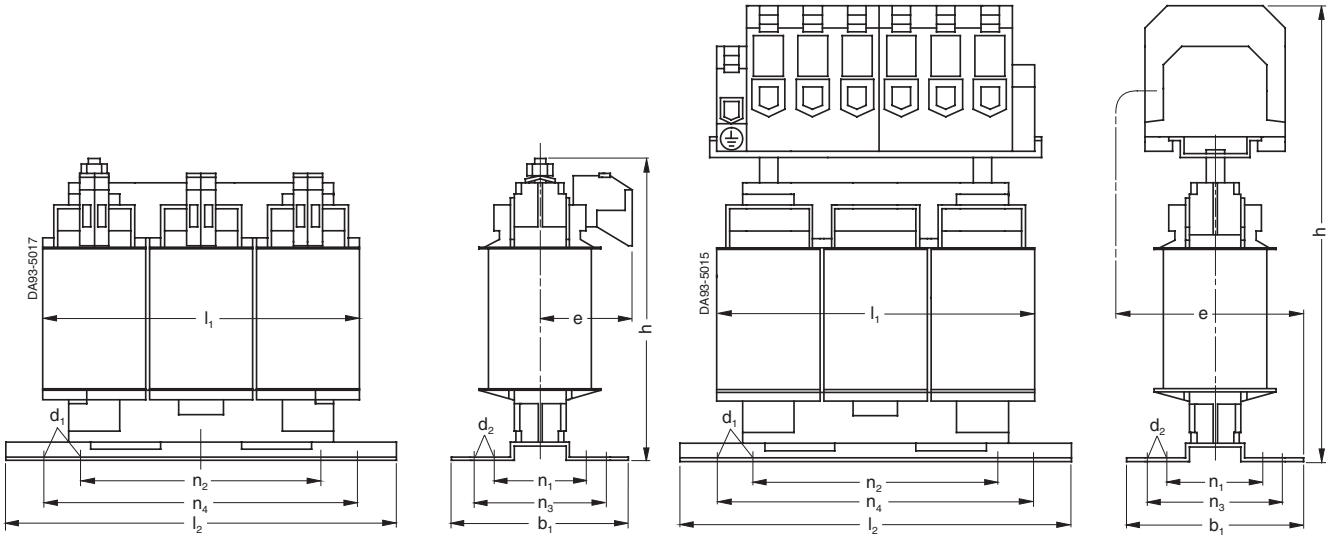
with f = line frequency (50 Hz or 60 Hz)

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.



4EP ≤ 35 A

Earth stud M6 x 12
for connection of cables with ring terminal end

4EP 40 A to 50 A

Terminal 8WA9 200
(for I_{Ln} ≤ 15 A)

Cross-sections:	solid:	0.5 mm² to 6 mm²
	finely stranded:	1.5 mm² to 4 mm²

Terminal RKW110 or TRKSD10
(for I_{Ln} ≤ 16 to 35.5 A)

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

Earth stud M6 x 12

Cross-sections:	solid:	2.5 mm² to 10 mm²
	finely stranded:	4 mm² to 10 mm²

Terminal 8WA1 304
(for I_{Ln} = 40 A to 50 A)

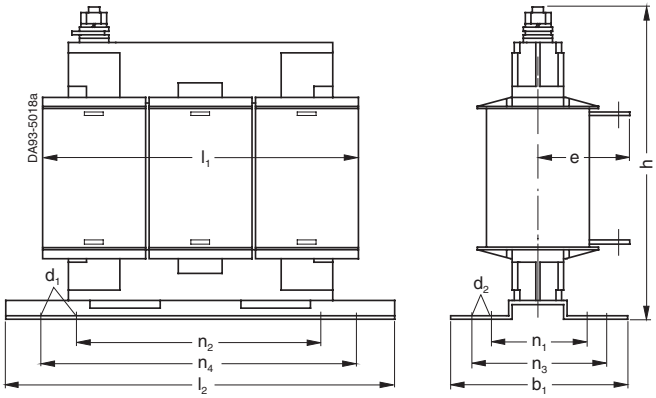
Cross-sections:	solid:	1 mm² to 16 mm²
	stranded:	10 mm² to 25 mm²
	finely stranded:	2.5 mm² to 16 mm²

Corresponding earth terminal EK16/35

Cross-sections:	solid:	2.5 mm² to 16 mm²
	finely stranded:	4 mm² to 16 mm²

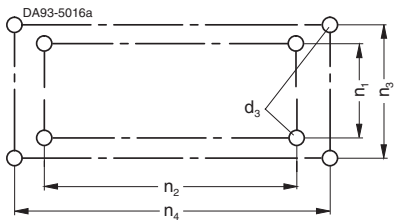
Type	b_1	d_1	d_2	d_3	e	h	l_1	l_2	n_1	n_2	n_3	n_4
I_{Ln} ≤ 35 A, terminal connections for user-defined arrangement of reactors												
4EP32	57.5	4.8	9	M4	56	108	78	88.5	34	1)	42.5	79.5
4EP33	64	4.8	9	M4	55	122	96	124	33	1)	44	112
4EP34	73	4.8	9	M4	59	122	96	124	42	1)	53	112
4EP35	68	4.8	9	M4	57	139	120	148	39	90	48	136
4EP36	78	4.8	9	M4	62	139	120	148	49	90	58	136
4EP37	73	5.8	11	M5	60	159	150	178	49	113	53	166
4EP38	88	5.8	11	M5	67	159	150	178	64	113	68	166
4EP39	99	7.0	13	M6	62	181	182	219	56	136	69	201
4EP40	119	7.0	13	M6	72	181	182	219	76	136	89	201
I_{Ln} 40 A to 50 A, terminal connections for user-defined arrangement of reactors												
4EP37	73	5.8	11	M5	78.5	193	150	178	49	113	53	166
4EP38	88	5.8	11	M5	86.0	193	150	178	64	113	68	166
4EP39	99	7.0	13	M6	91.5	220	182	219	56	136	69	201
4EP40	119	7.0	13	M6	101.5	220	182	219	76	136	89	201

1) Fixing slot in the base centre



4EP ≥ 51 A

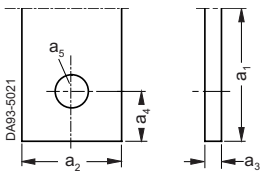
Earth stud M6 x 12
for connection of cables with ring terminal end



Mounting holes

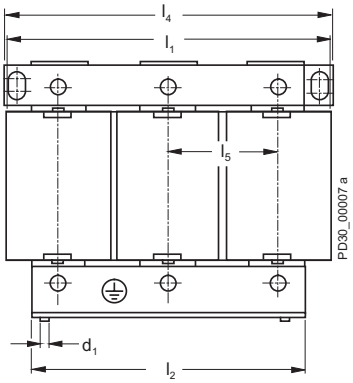
n_1 and n_2 mounting holes according to DIN 41308
n_3 and n_4 mounting holes according to EN 60852-4

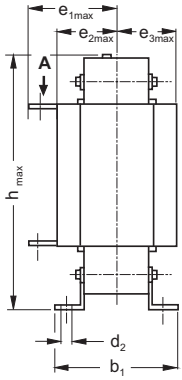
Type	b_1	d_1	d_2	d_3	e	h	l_1	l_2	n_1	n_2	n_3	n_4
I_{Ln} ≥ 51 A, flat termination for user-defined arrangement of reactors												
4EP38	88	5.8	11	M5	76	153	150	178	64	113	68	166
4EP39	99	7.0	13	M6	73	179	182	219	56	136	69	201
4EP40	119	7.0	13	M6	83	179	182	219	76	136	89	201

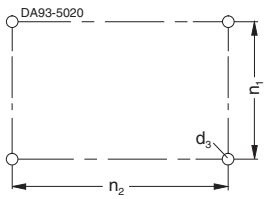


Flat termination

I_{Ln}	a_1	a_2	a_3	a_4	a_5
Flat termination					
51 to 80 A	30	20	3	10	9
81 to 200 A	35	25	5	12.5	11



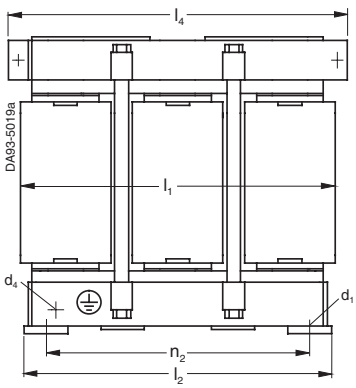


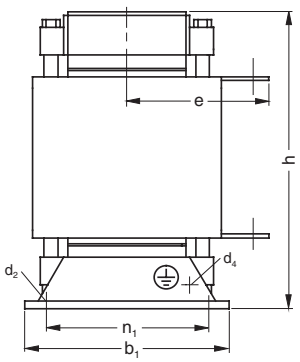


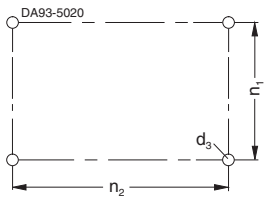
4EU24 to **4EU36**

Mounting holes

Type	b_1	d_1	d_2	d_3	$e_{1\,max}$	$e_{2\,max}$	$e_{3\,max}$	h_{max}	l_1	l_2	l_4	l_5	n_1	n_2	Earth
for 4EU24 to 4EU36 with flat terminations, for arrangement of reactors on horizontal surfaces															
4EU24	91	7	13	M6	101.5	60.5	48.5	210	225	190	–	76	70	176	M6
4EU25	115	7	13	M6	118.5	72.5	60.5	210	225	190	–	76	94	176	M6
4EU27	133	10	18	M8	141.5	83.5	67.5	248	260	220	270	88	101	200	M6
4EU30	148	10	18	M8	147.0	89.0	73.0	269	295	250	300	100	118	224	M6
4EU36 (Cu)	169	10	18	M8	152.0	94.0	78.0	321	357	300	350	120	138	264	M8
4EU36	169	10	18	M8	197.0	115.0	91.0	321	357	300	350	120	138	264	M8



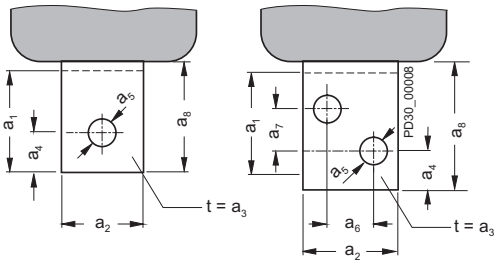




4EU39 to **4EU51**

Mounting holes

Type	b_1	d_1	d_2	d_3	$e_{1\,max}$	$e_{2\,max}$	$e_{3\,max}$	h_{max}	l_1	l_2	l_4	l_5	n_1	n_2	Earth
for 4EU39 to 4EU52 with flat terminations, for arrangement of reactors on horizontal surfaces															
4EU39	174	12.0	18.0	M10	197	–	–	385	405	366	410	–	141	316	M6
4EU43	194	15.0	22.0	M12	212	–	–	435	458	416	460	–	155	356	M6
4EU45	221	15.0	22.0	M12	211	–	–	435	458	416	460	–	182	356	M6
4EU47	251	15.0	22.0	M12	231	–	–	435	458	416	460	–	212	356	M6
4EU50	195	12.5	12.5	M10	220	–	–	565	533	470	518	–	158	410	M12
4EU52	220	12.5	12.5	M10	242	–	–	565	533	470	518	–	183	410	M12



Version
up to 1000 A

Version
> 1000 A

Flat termination	a_1	a_2	a_3 Al	a_3 Cu	a_4	a_5	a_6	a_7	$a_{8\,max}$
for 4EU24 to 4EU36, for arrangement of reactors on horizontal surfaces									
≤ 80 A	20	20	4	3	10.0	9	–	–	34
≤ 200 A	25	25	6	5	12.5	11	–	–	41
≤ 315 A	30	30	6	6	15.0	14	–	–	46
≤ 800 A	40	40	8	6	20.0	14	–	–	58
≤ 1000 A	40	40	10	8	20.0	14	–	–	60
≤ 1600 A	60	60	12	12	17.0	14	26	26	82
for 4EU39 to 4EU52, for arrangement of reactors on horizontal surfaces									
45 A to 80 A	30	20	–	3	10.0	9	–	–	–
81 A to 200 A	35	25	–	5	12.5	11	–	–	–
201 A to 315 A	40	30	–	6	15.0	14	–	–	–
316 A to 800 A	50	40	–	6	20.0	14	–	–	–
801 A to 1000 A	50	40	–	8	20.0	14	–	–	–
1001 A to 1600 A	60	60	–	12	17.0	14	26	26	–