

# Estimating short-circuits and calculation example (continued)

## 2 COMPOSITION METHOD

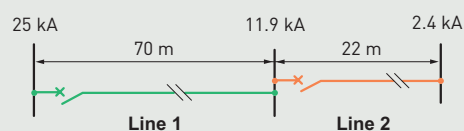
This method is a simplified approach. With a knowledge of the three-phase short-circuit current at the origin of the installation (see previous section), this approach enables the prospective short-circuit current  $I_{k3}$  at the end of a wiring system of given length and cross-section to be estimated.

This method applies to installations whose power does not exceed 800 kVA. The maximum short-circuit current at any point in the installation is determined using the following tables, based on the:

- Prospective short-circuit current at the supply end of the installation
- Length of the line
- Type and cross-section of the conductors

Aluminium conductors - 240/400 V																										
Ik3 upstream (kA)	Short-circuit current at the level in question (Ik3 downstream in kA)																									
	100	93.5	91.1	87.9	83.7	78.4	71.9	64.4	56.1	47.5	39.0	31.2	24.2	18.5	13.8	10.2	7.4	5.4	3.8	2.8	2.0	1.4	1.0			
90	82.7	82.7	80.1	76.5	72.1	66.6	60.1	52.8	45.1	37.4	30.1	23.6	18.1	13.6	10.1	7.3	5.3	3.8	2.7	2.0	1.4	1.0				
80	74.2	74.2	72.0	69.2	65.5	61.0	55.5	49.2	42.5	35.6	28.9	22.9	17.6	13.3	9.9	7.3	5.3	3.8	2.7	2.0	1.4	1.0				
70	65.5	65.5	63.8	61.6	58.7	55.0	50.5	45.3	39.5	33.4	27.5	22.0	17.1	13.0	9.7	7.2	5.2	3.8	2.7	1.9	1.4	1.0				
60	56.7	56.7	55.4	53.7	51.5	48.6	45.1	40.9	36.1	31.0	25.8	20.9	16.4	12.6	9.5	7.1	5.2	3.8	2.7	1.9	1.4	1.0				
50	47.7	47.7	46.8	45.6	43.9	41.8	39.2	36.0	32.2	28.1	23.8	19.5	15.6	12.1	9.2	6.9	5.1	3.7	2.7	1.9	1.4	1.0				
40	38.5	38.5	37.9	37.1	36.0	34.6	32.8	30.5	27.7	24.6	21.2	17.8	14.5	11.4	8.8	6.7	5.0	3.6	2.6	1.9	1.4	1.0				
35	33.8	33.8	33.4	32.8	31.9	30.8	29.3	27.5	25.2	22.6	19.7	16.7	13.7	11.0	8.5	6.5	4.9	3.6	2.6	1.9	1.4	1.0				
30	29.1	29.1	28.8	28.3	27.7	26.9	25.7	24.3	22.5	20.4	18.0	15.5	12.9	10.4	8.2	6.3	4.8	3.5	2.6	1.9	1.4	1.0				
25	24.4	24.4	24.2	23.8	23.4	22.8	22.0	20.9	19.6	18.0	16.1	14.0	11.9	9.8	7.8	6.1	4.6	3.4	2.5	1.9	1.3	1.0				
20	19.6	19.6	19.5	19.2	19.0	18.6	18.0	17.3	16.4	15.2	13.9	12.3	10.6	8.9	7.2	5.7	4.4	3.3	2.5	1.8	1.3	1.0				
15	14.8	14.8	14.7	14.6	14.4	14.2	13.9	13.4	12.9	12.2	11.3	10.2	9.0	7.7	6.4	5.2	4.1	3.2	2.4	1.8	1.3	0.9				
10	9.9	9.9	9.9	9.8	9.7	9.6	9.5	9.3	9.0	8.6	8.2	7.6	6.9	6.2	5.3	4.4	3.6	2.9	2.2	1.7	1.2	0.9				
7	7.0	7.0	6.9	6.9	6.9	6.8	6.7	6.6	6.5	6.3	6.1	5.7	5.3	4.9	4.3	3.7	3.1	2.5	2.0	1.6	1.2	0.9				
5	5.0	5.0	5.0	5.0	4.9	4.9	4.9	4.8	4.7	4.6	4.5	4.3	4.1	3.8	3.5	3.1	2.7	2.2	1.8	1.4	1.1	0.8				
4	4.0	4.0	4.0	4.0	4.0	3.9	3.9	3.9	3.8	3.8	3.7	3.6	3.4	3.2	3.0	2.7	2.3	2.0	1.7	1.3	1.0	0.8				
3	3.0	3.0	3.0	3.0	3.0	3.0	3.0	2.9	2.9	2.9	2.8	2.7	2.6	2.5	2.4	2.2	2.0	1.7	1.5	1.2	1.0	0.8				
2	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.8	1.8	1.7	1.6	1.5	1.3	1.2	1.0	0.8				
1	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.9	0.9	0.9	0.8	0.8	0.7	0.7	0.6	0.5				
Phase conductor cross-section (mm²)	Length of the wiring system (in metres)																									
	2.5															1.3	1.9	2.7	3.8	5.4	7.6	10.8	15	22		
4															1.1	1.5	2.2	3.0	4.3	6.1	8.6	12	17	24	34	
6															1.6	1.7	2.5	3.5	4.9	7.0	9.9	14	20	28	40	
10															1.5	2.1	2.9	4.1	5.8	8.2	11.6	16	23	33	47	66
16																										
25																										
35																										
50																										
70																										
95																										
120																										
150																										
185																										
240																										
300																										
2 x 120	1.4	1.9	2.7	3.9	5.5	7.8	11	16	22	31	44	62	88	124	176	249	352	497								
2 x 150	1.6	2.2	3.1	4.4	6.2	8.8	12	18	25	35	50	70	99	141	199	281	398									
2 x 185	1.8	2.6	3.7	5.2	7.3	10.4	15	21	29	42	59	83	117	166	235	332	470									
2 x 240	2.3	3.2	4.6	6.5	9.1	12.9	18	26	37	52	73	103	146	207	293	414	583									
3 x 120	2.1	3.0	4.3	6.1	8.6	12.1	17	24	34	48	69	97	137	194	274	388	549									
3 x 150	2.3	3.3	4.7	6.6	9.3	13.2	19	26	37	53	75	105	149	211	298	422	596									
3 x 185	2.8	3.9	5.5	7.8	11.0	15.6	22	31	44	62	88	125	176	249	352	498	705									
2 x 300	2.8	3.8	5.4	7.8	11	16	22	32	44	62	88	124	176	248	352	498										
3 x 240	3.4	4.8	6.9	9.7	13.7	19	27	39	55	78	110	155	219	310	439	621										
4 x 240	4.6	6.4	9.2	13	18	26	36	52	74	104	146	206	292	414	586											
4 x 300	5.6	7.6	10.8	14.6	22	32	44	64	88	124	176	248	352	496	704											

### Example



- Line 1
    - Ik3 at origin: 25 kA
    - Copper cable: 120 mm<sup>2</sup>
    - Length: 75 m (73 m)
  - Line 2
    - Ik3 upstream: 11.9 kA rounded up to 15 kA
    - Copper cable: 6 mm<sup>2</sup>
    - Length: 25 m (22 m)
- ⇒ Ik3 downstream: 11.9 kA    ⇒ Ik3 downstream: 2.4 kA

### Copper conductors - 240/400 V

Ik3 upstream (kA)	Short-circuit current at the level in question (Ik3 downstream in kA)																									
	93.5	91.1	87.9	83.7	78.4	71.9	64.4	56.1	47.5	39.0	31.2	24.2	18.5	13.8	10.2	7.4	5.4	3.8	2.8	2.0	1.4	1.0				
100	82.7	82.7	80.1	76.5	72.1	66.6	60.1	52.8	45.1	37.4	30.1	23.6	18.1	13.6	10.1	7.3	5.3	3.8	2.7	2.0	1.4	1.0				
90	74.2	74.2	72.0	69.2	65.5	61.0	55.5	49.2	42.5	35.6	28.9	22.9	17.6	13.3	9.9	7.3	5.3	3.8	2.7	2.0	1.4	1.0				
80	65.5	65.5	63.8	61.6	58.7	55.0	50.5	45.3	39.5	33.4	27.5	22.0	17.1	13.0	9.7	7.2	5.2	3.8	2.7	1.9	1.4	1.0				
70	56.7	56.7	55.4	53.7	51.5	48.6	45.1	40.9	36.1	31.0	25.8	20.9	16.4	12.6	9.5	7.1	5.2	3.8	2.7	1.9	1.4	1.0				
60	47.7	47.7	46.8	45.6	43.9	41.8	39.2	36.0	32.2	28.1	23.8	19.5	15.6	12.1	9.2	6.9	5.1	3.7	2.7	1.9	1.4	1.0				
50	38.5	38.5	37.9	37.1	36.0	34.6	32.8	30.5	27.7	24.6	21.2	17.8	14.5	11.4	8.8	6.7	5.0	3.6	2.6	1.9	1.4	1.0				
40	33.8	33.8	33.4	32.8	31.9	30.8	29.3	27.5	25.2	22.6	19.7	16.7	13.7	11.0	8.5	6.5	4.9	3.6	2.6	1.9	1.4	1.0				
30	29.1	29.1	28.8	28.3	27.7	26.9	25.7	24.3	22.5	20.4	18.0	15.5	12.9	10.4	8.2	6.3	4.8	3.5	2.6	1.9	1.4	1.0				
25	24.4	24.4	24.2	23.8	23.4	22.8	22.0	20.9	19.6	18.0	16.1	14.0	11.9	9.8	7.8	6.1	4.6	3.4	2.5	1.9	1.3	1.0				
20	19.6	19.6	19.5	19.2	19.0	18.6	18.0	17.3	16.4	15.2	13.9	12.3	10.6	8.9	7.2	5.7	4.4	3.3	2.5	1.8	1.3	1.0				
15	14.8	14.8	14.7	14.6	14.4	14.2	13.9	13.4	12.9	12.2	11.3	10.2	9.0	7.7	6.4	5.2	4.1	3.2	2.4	1.8	1.3	0.9				
10	9.9	9.9	9.9	9.8	9.7	9.6	9.5	9.3	9.0	8.6	8.2	7.6	6.9	6.2	5.3	4.4	3.6	2.9	2.2	1.7	1.2	0.9				
7	7.0	7.0	6.9	6.9	6.9	6.8	6.7	6.6	6.5	6.3	6.1	5.7	5.3	4.9	4.3	3.7	3.1	2.5	2.0	1.6	1.2	0.9				
5	5.0	5.0	5.0	5.0	4.9	4.9	4.9	4.8	4.7	4.6	4.5	4.3	4.1	3.8	3.5	3.1	2.7	2.2	1.8	1.4	1.1	0.8				
4	4.0	4.0	4.0	4.0	4.0	3.9	3.9	3.9	3.8	3.8	3.7	3.6	3.4	3.2	3.0	2.7	2.3	2.0	1.7	1.3	1.0	0.8				
3	3.0	3.0	3.0	3.0	3.0	3.0	3.0	2.9	2.9	2.9	2.8	2.7	2.6	2.5	2.4	2.2	2.0	1.7	1.5	1.2	1.0	0.8				
2	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.8	1.8	1.7	1.6	1.5	1.3	1.2	1.0	0.8	0.7				
1	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.9	0.9	0.9	0.8	0.8	0.7	0.7	0.6	0.5				
Phase conductor cross-section (mm <sup>2</sup> )	Length of the wiring system (in metres)																									
	1.5	2.5	4	6	10	16	25	35	50	70	95	120	150	185	240	300	2 x 120	2 x 150	2 x 185	3 x 120	3 x 150	2 x 240	3 x 185	4 x 185	4 x 240	
1.5																										
2.5													1.1	1.5	2.1	3.0	4.3	6.1	8.6	12	17	24	34			
4													1.7	1.9	2.6	3.7	5.3	7.4	10.5	15	21	30	42			
6													1.4	2.0	4.0	5.6	7.9	11.2	16	22	32	45	63			
10												2.1	3.0	4.3	6.1	8.6	12.1	17	24	34	48	68	97	137		
16											1.7	2.4	3.4	4.8	6.8	9.7	14	19	27	39	55	77	110	155	219	
25						1.3	1.9	2.7	3.8	5.4	7.6	10.7	15	21	30	43	61	86	121	171	242	342				
35						1.9	2.6	3.7	5.3	7.5	10.6	15	21	30	42	60	85	120	170	240	339	479				
50					1.8	2.5	3.6	5.1	7.2	10.2	14	20	29	41	58	81	115	163	230	325	460					
70					2.6	3.7	5.3	7.5	10.6	15	21	30	42	60	85	120	170	240	339	460						
95				2.5	3.6	5.1	7.2	10.2	14	20	29	41	58	81	115	163	230	325	460							
120		1.6	2.3	3.2	4.5	6.4	9.1	13	18	26	36	51	73	103	145	205	291	411								
150	1.2	1.7	2.5	3.5	4.9	7.0	9.9	14	20	28	39	56	79	112	158	223	316	447								
185	1.5	2.1	2.9	4.1	5.8	8.2	11.7	16	23	33	47	66	93	132	187	264	373	528								
240	1.8	2.6	3.6	5.1	7.3	10.3	15	21	29	41	58	82	116	164	232	329	465	658								
300	2.2	3.1	4.4	6.2	8.7	12.3	17	25	35	49	70	99	140	198	279	395	559									
2 x 120	2.3	3.2	4.5	6.4	9.1	12.8	18	26	36	51	73	103	145	205	291	411	581									
2 x 150	2.5	3.5	4.9	7.0	9.9	14	20	28	39	56	79	112	158	223	316	447	632									
2 x 185	2.9	4.1	5.8	8.2	11.7	16.5	23	33	47	66	93	132	187	264	373	528	747									
3 x 120	3.4	4.8	6.8	9.6	13.6	19	27	39	54	77	109	154	218	308	436	616										
3 x 150	3.7	5.2	7.4	10.5	14.8	21	30	42	59	84	118	168	237	335	474	670										
2 x 240	3.6	5.2	7.2	10.2	14.6	21	30	42	58	82	116	164	232	328	464	658										
3 x 185	4.4	6.2	8.8	12.4	17.5	25	35	49	70	99	140	198	280	396	560											
4 x 185	3.8	5.2	7.4	10.5	14.8	21	30	42	59	84	118	168	237	335	474	670										
4 x 240	7.2	10.4	14.4	20	29	41	60	84	116	164	232	328	464	656												