

PROTECTION OF PV INVERTERS



**New generation of
NH gG and gS fuse-links
for cable protection in 800V a.c.
system in standard NH sizes**

New directions in PV inverters development

New directions in PV inverters development...

PV inverters are getting larger and smarter, their characteristics better and better, they have become smart, safe, reliable and efficient.

Higher yields are reached by utilizing dynamic system efficiency optimization with intelligent technology. Achieved efficiency currently ranges above 98,5%. One of most important technical features of the new generation of PV inverters is 800V a.c. output voltage instead of 400V a.c. With this output voltage increase, we achieve a 75% decrease in a.c. connection wires losses. Yet, because of the increased output voltage modern PV central inverters demand a specially designed fuse-link for reliable short-circuit and over-current protection.

... and new fuse-links to answer the increased demands of their output protection

As one of the first among the producers of NH fuse-links, ETI has developed a new generation of NH gG fuse-links, specially designed for cable protection on 800V a.c. system voltage. With an innovative design of melting elements, adoption of high temperature and internal pressure resistant ceramic material, the final NH fuse-link construction can now be incorporated in a standard NH size dimensions.

At the moment ETI is offering sizes NH00, NH1 and NH3 gG fuse-links, from rated current 6A up to 315A, designed and tested on 800V a.c. with very low power dissipation and high breaking capacity. On a customer request, we are also ready to develop even higher rated currents.

Features and benefits

- ✓ Load switching capacity up to 800V a.c.
- ✓ Meets IEC photovoltaic standards
- ✓ In standard NH size dimensions
- ✓ Extremely low power dissipation
- ✓ High breaking capacity
- ✓ Designed to protect against a full range of overcurrents
- ✓ High temperature and internal pressure resistant ceramic material
- ✓ Innovative design of melting elements

Applications

- ✓ For cable protection on a.c. side of 1500V PV inverter



NH gG 800V a.c. Fuse-links

General characteristics

Rated voltage	800V a.c.
Rated current	6A - 315A
Breaking capacity	120kA
Characteristic	gG
Standards	IEC 60269-2
Application	For cable protection on a.c. side of PV inverter

NV/NH gG 800V a.c.

Size	Breaking capacity [kA]	I _n [A]	Code No.	Pre-arcing Joule integral [A²s]	Operating Joule integral [A²s]	Power dissipation [0,7 x I _n] Pd [W]	Power dissipation [W]	Weight [g]	Pack. [pcs]	
NH00	120	6	004184512	63	650	0,8	1,9	173	3/90	
		10	004184513	35	850	0,6	1,3			
		16	004184514	120	1.800	1,1	2,4			
		20	004184515	225	4.000	1,1	2,6			
		25	004184516	300	6.500	1,2	2,7			
		35	004184518	1.800	10.000	1,5	3,3			
		40	004184519	2.100	13.500	1,8	4,0			
		50	004184520	4.300	27.000	2,1	4,8			
63		004184521	7.000	43.000	2,6	6,0				
NH1		25	004184482	600	14.000	1,4	3,2	420	3/24	
		35	004184483	2.400	35.000	1,5	3,4			
		40	004184484	3.200	50.000	1,8	4,0			
		50	004184485	3.500	70.000	1,9	4,4			
		63	004184486	5.500	120.000	2,4	5,5			
		80	004184487	11.000	145.000	3,0	6,9			
		100	004184488	18.000	185.000	3,8	8,6			
		125	004184489	27.000	260.000	4,3	9,7			
NH3		160	004184490	45.000	475.000	5,5	12,4	785	3/12	
		200	004184463*	55.000	500.000	8,1	18,5			
		160	004184524	28.000	400.000	6,3	14,4			
		200	004184525	70.000	690.000	6,4	14,5			
		60	250	004184526	110.000	1.100.000	9,7	22,0	1270	3/15
	315		004184498**	140.000	1.340.000	12,8	29,0			
	60		355	004184528	280.000	1.700.000	12,5	27,5	1270	3/15
			400	004184529	350.000	2.100.000	14,7	32,5		

* Breaking capacity: 30kA

** Top visual indicator



Recommended Accessories

- ✓ Ceramic fuse bases
- ✓ Plastic fuse bases
- ✓ Fuse disconnectors

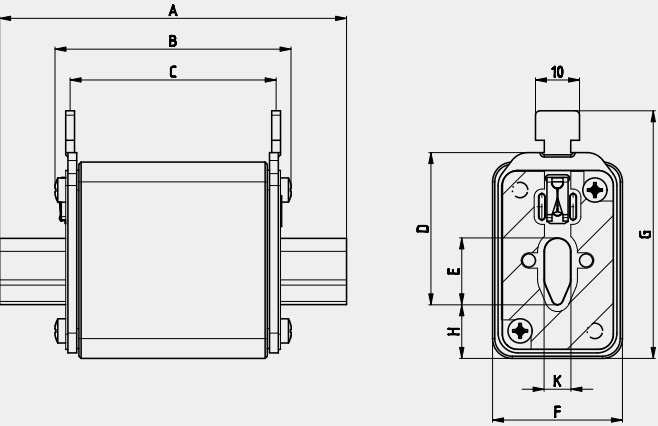


Dimensions

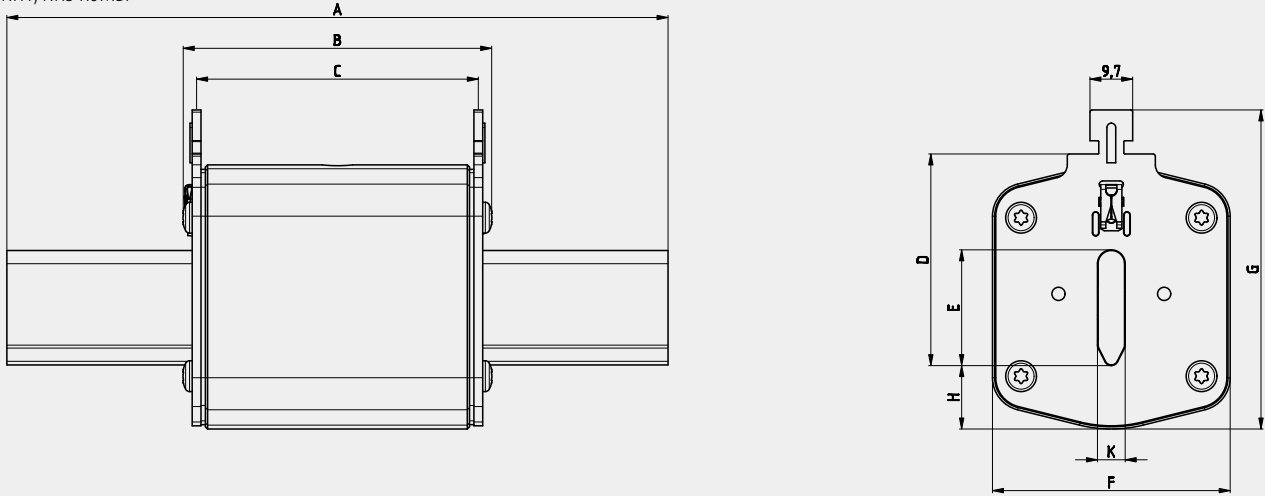
Size	Dimensions [mm]								
	A	B	C	D	E	F	G	H	K
00	79	53	47	35	15	28	56	12	6
1	135	72	65	40	20	46	65	14	6
3	150	74	70	60	37	73	87	13	6
3*	150	74	70	60	37	73	87	13	6

*Top visual indicator

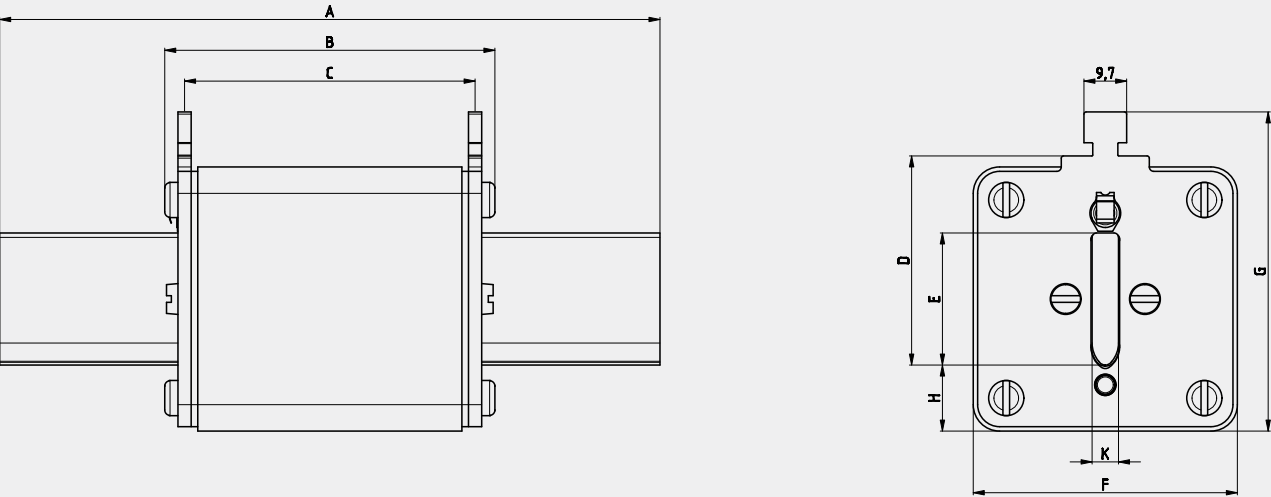
NH00 KOMBI



NH1, NH3 KOMBI

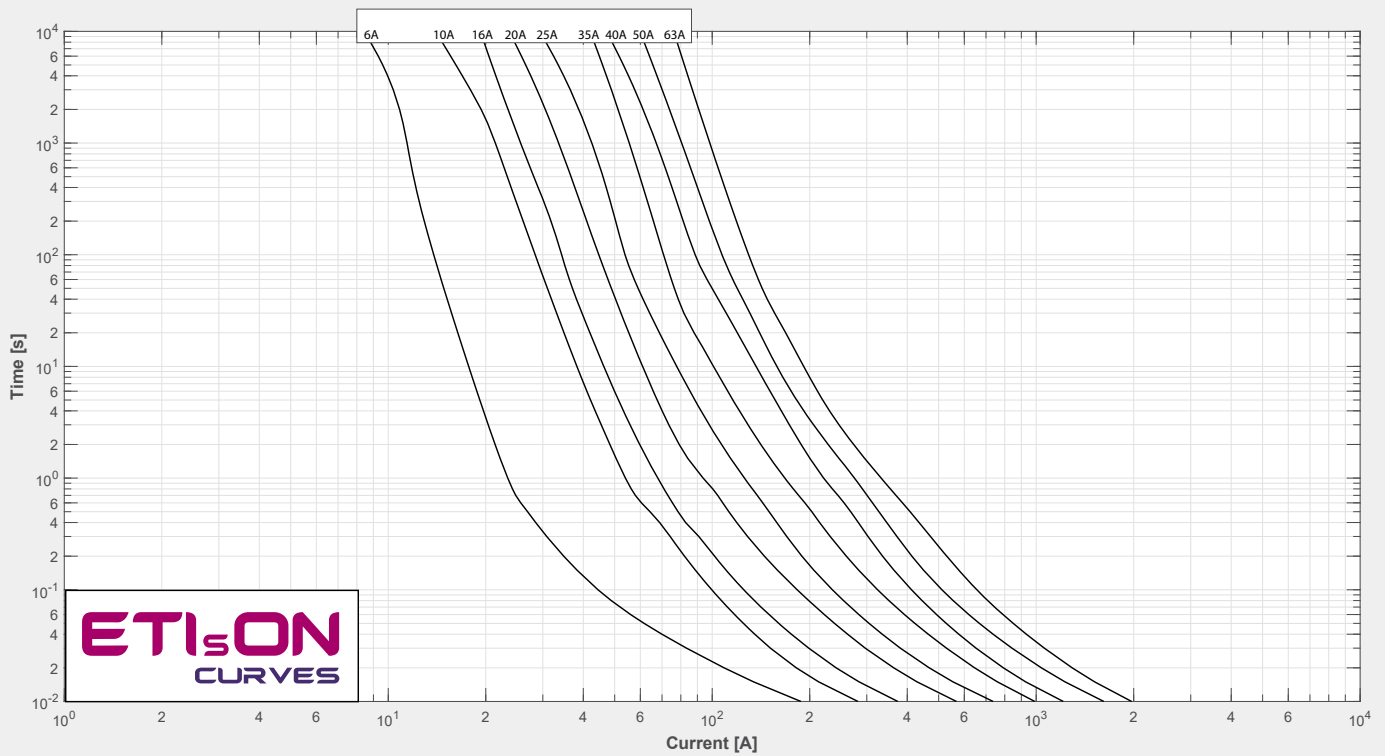


NH3

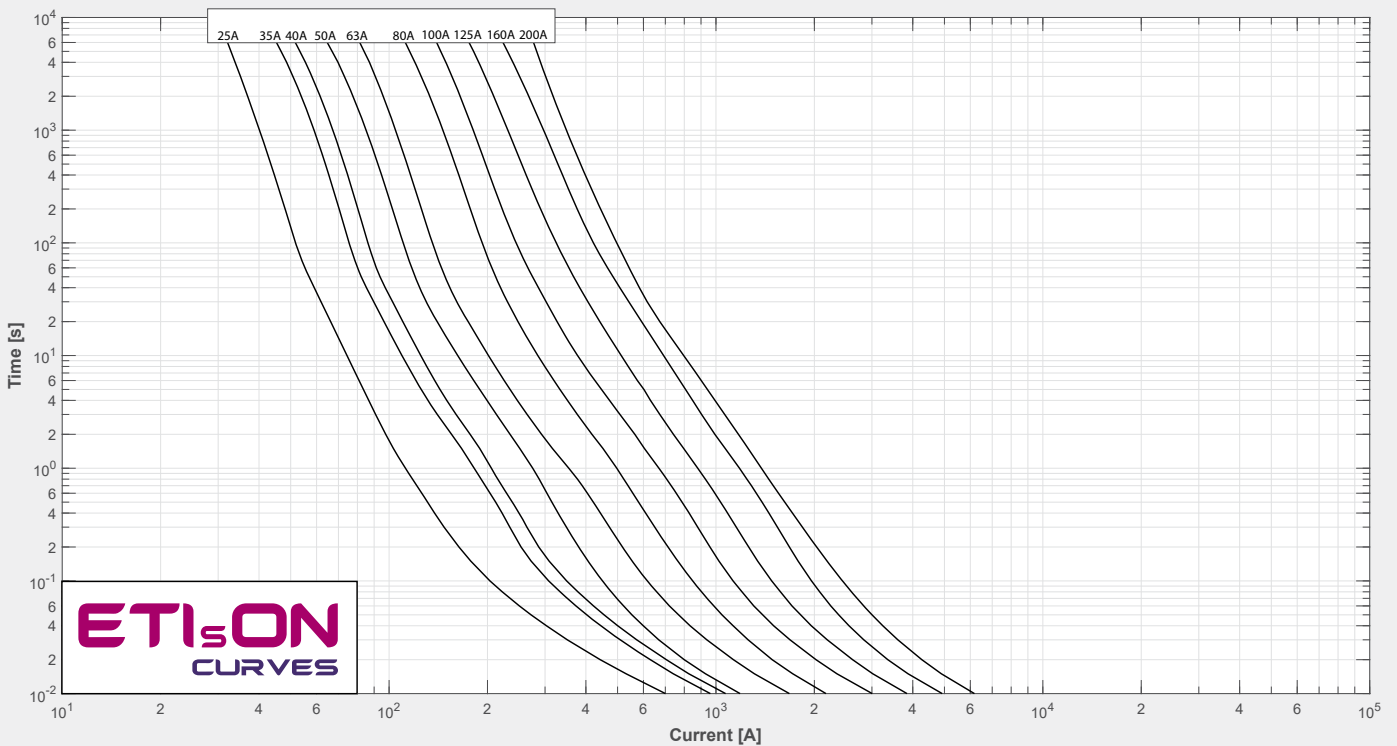


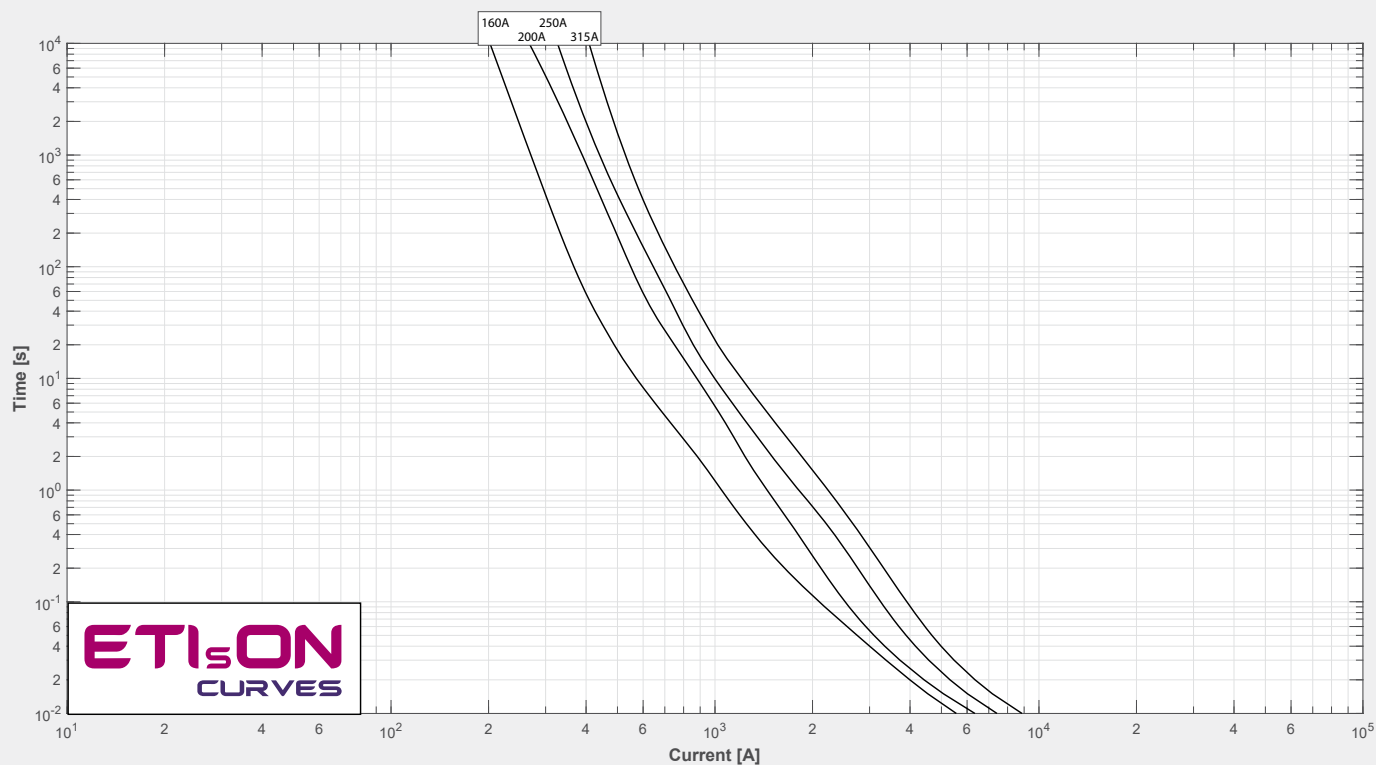
I/t characteristics

NH00 KOMBI

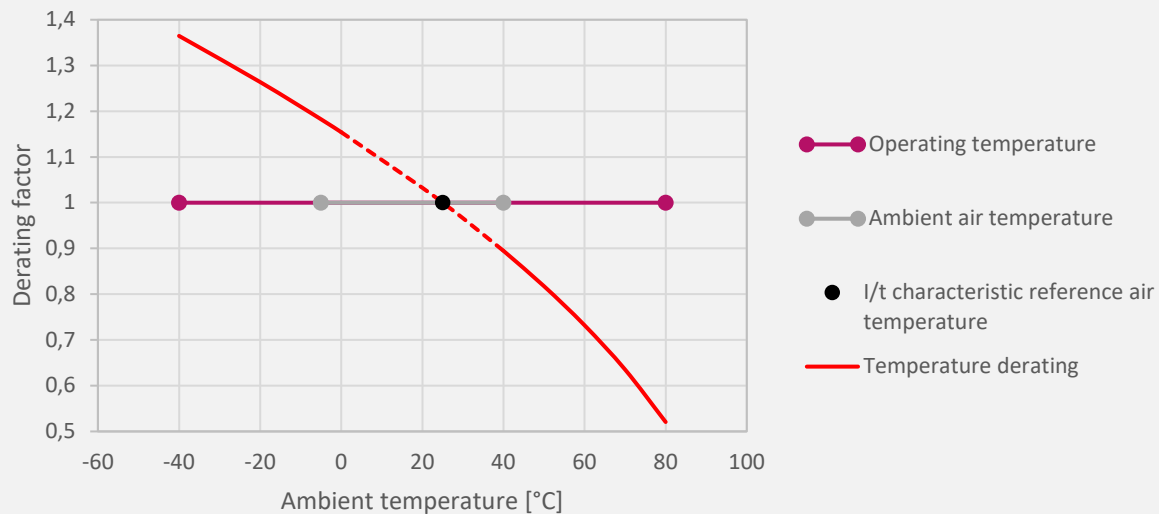


NH1 KOMBI





Ambient air temperature of fuse-link



Legend:

T_{amb} – Ambient Temperature

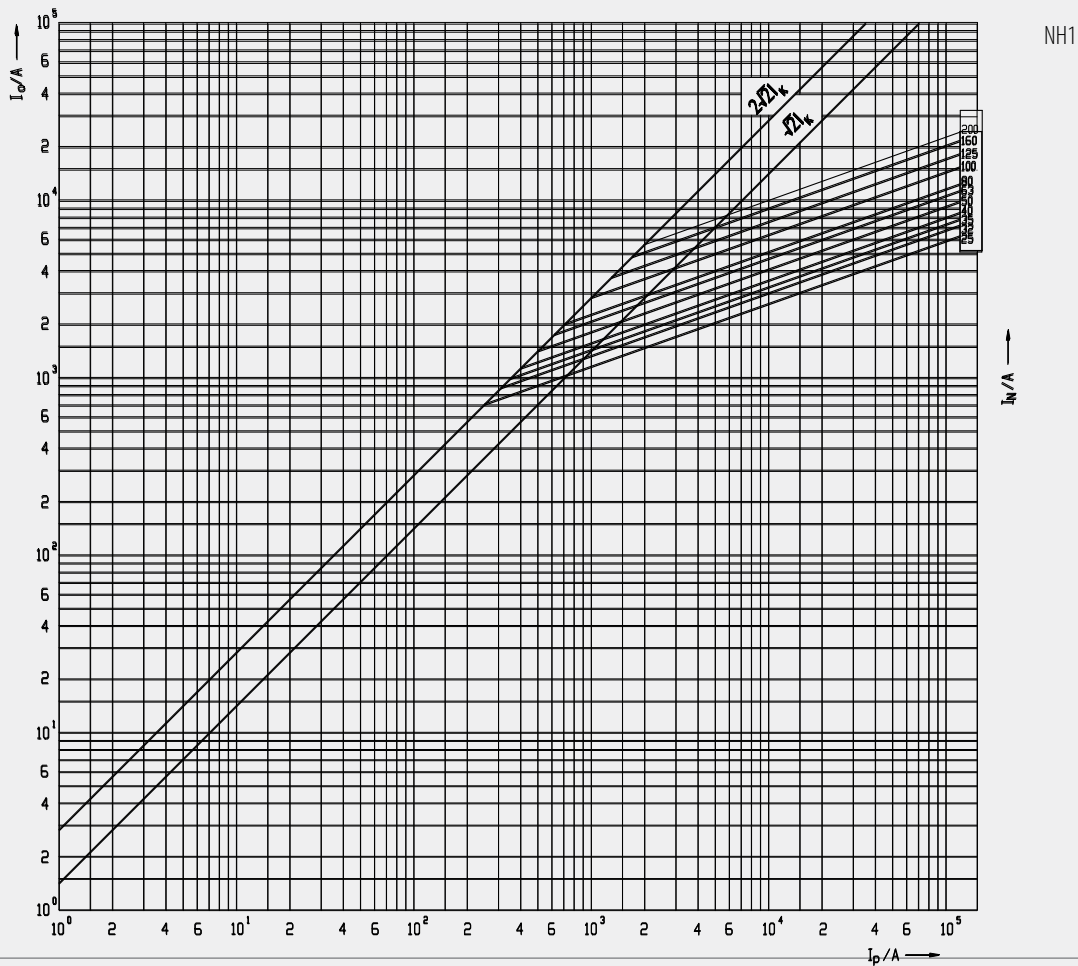
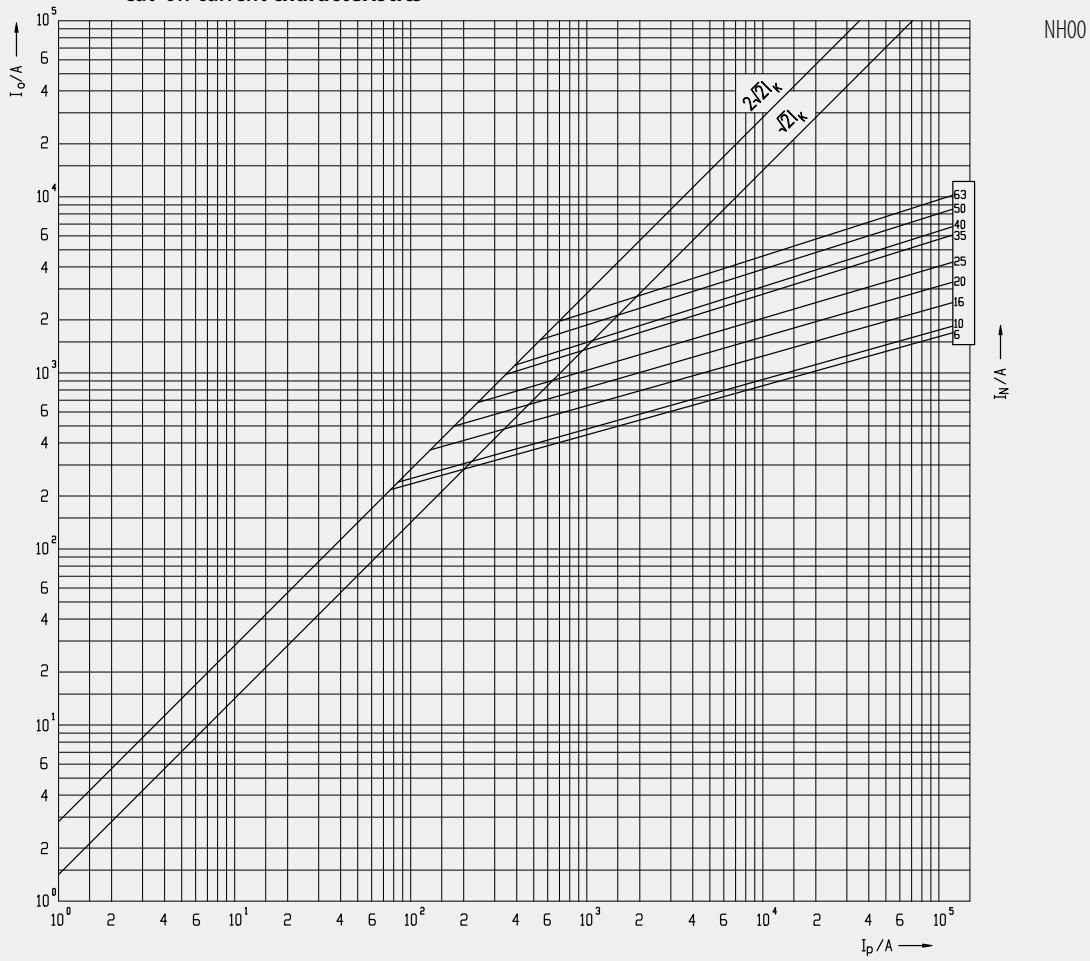
TDF – Temperature Derating Factor

I_N – Nominal Current of Fuse-link

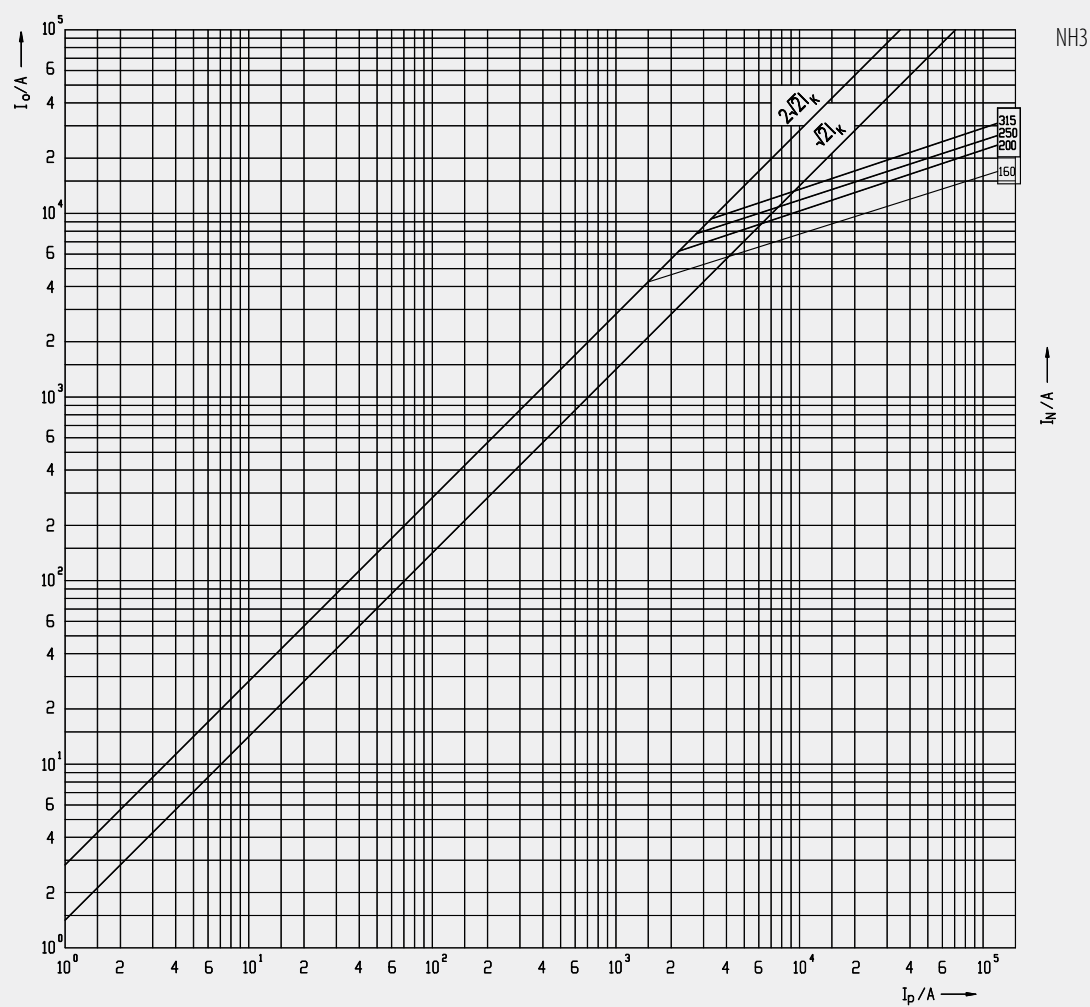
I_{TDF} – Nominal Current Including Temperature Derating Factor

Current calculation: $I_{TDF} = I_N \times TDF$

Cut-off current characteristics



Cut-off current characteristics



NH gS 800V a.c. Fuse-links

General characteristics

Rated voltage	800V a.c.
Rated current	16 - 500A
Breaking capacity	30kA (NH00), 120kA (NH1-3)
Characteristic	gS
Standards	IEC 60269-4
Application	For cable protection on a.c. side of PV inverter

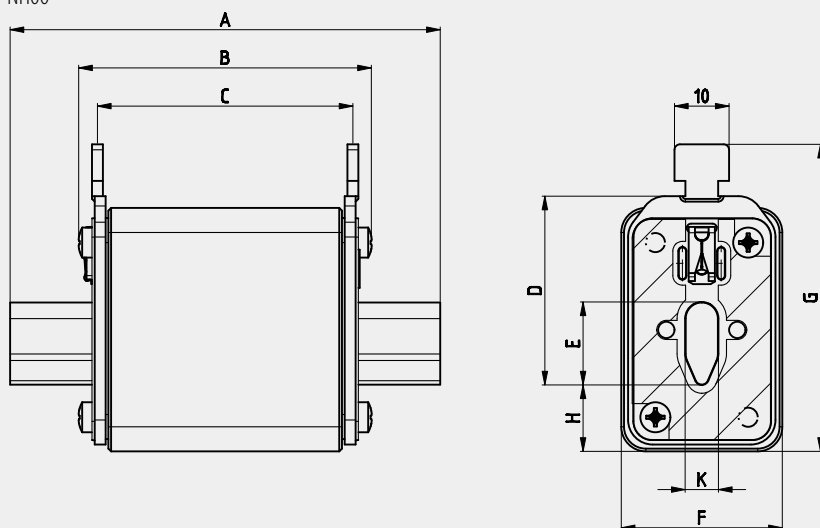
NV/NH gS 800V a.c.

Size	Breaking capacity [kA]	I _n [A]	Standard indicator	Pre-arcing Joule integral [A ² s]	Operating Joule integral [A ² s]	Power dissipation [0,7 x I _n] Pd [W]	Power dissipation [W]	Weight [g]	Packaging [pcs]
NH00	30	16	004184504	15	1000	1,3	3,1	173	3/90
		20	004184505	32	1200	1,3	3,2		
		25	004184506	54	1600	1,8	4,3		
		35	004184507	250	5500	1,8	4,3		
		40	004184508	390	6300	1,9	4,5		
		50	004184509	460	9500	2,4	5,7		
		63	004184502	510	18.400	2,6	6,2		
		80	004184501	1.360	32.000	2,8	6,7		
		100	004184500	3.000	60.000	3,8	9		
		125	004184503	4.000	72.000	5,4	12,9		
NH1	120	160	004723234	3.500	110.000	7,1	17	500	3/24
		200	004723235	9.000	145.000	8,0	19		
		250	004723236	18.000	275.000	9,2	22		
		315	004723237	35.000	490.000	11,7	28		
NH2	120	350	004724234	70.000	825.000	10,5	25	660	1/16
		400	004724235	95.000	1.020.000	12,6	30		
NH3	120	350	004725232	85.000	980.000	10,5	25	1200	3/15
		400	004725233	105.000	1.200.000	12,6	30		
		450	004725234	170.000	1.750.000	13,3	31,7		
		500	004725235	220.000	2.100.000	14,0	33,5		

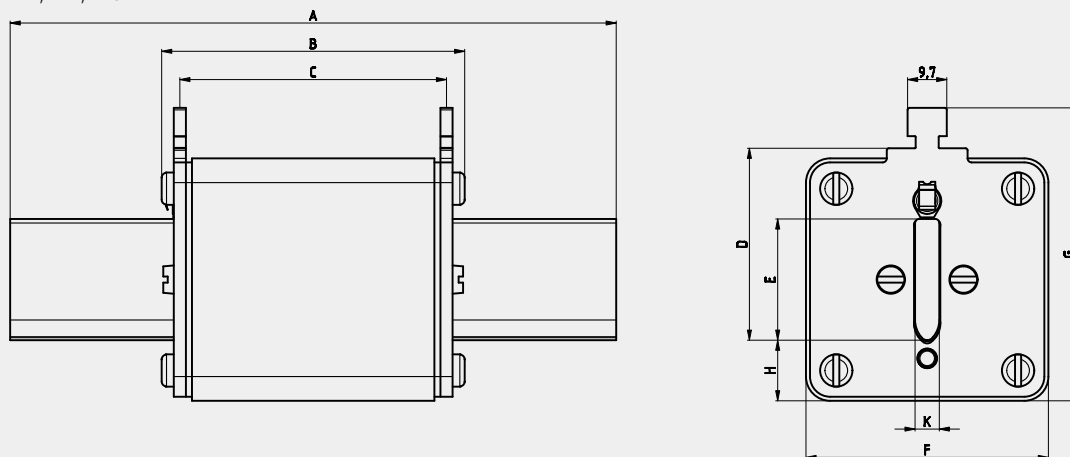


Dimensions

NH00



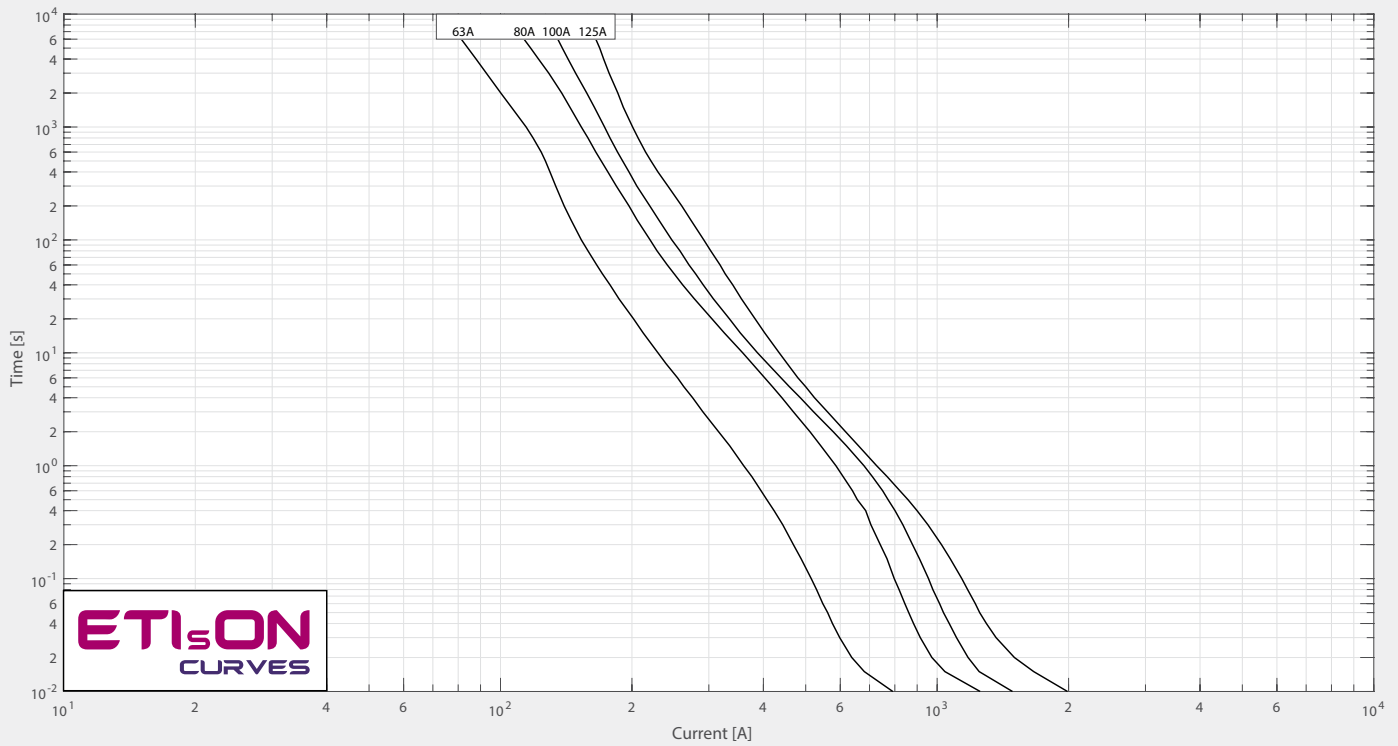
NH1, NH2, NH3



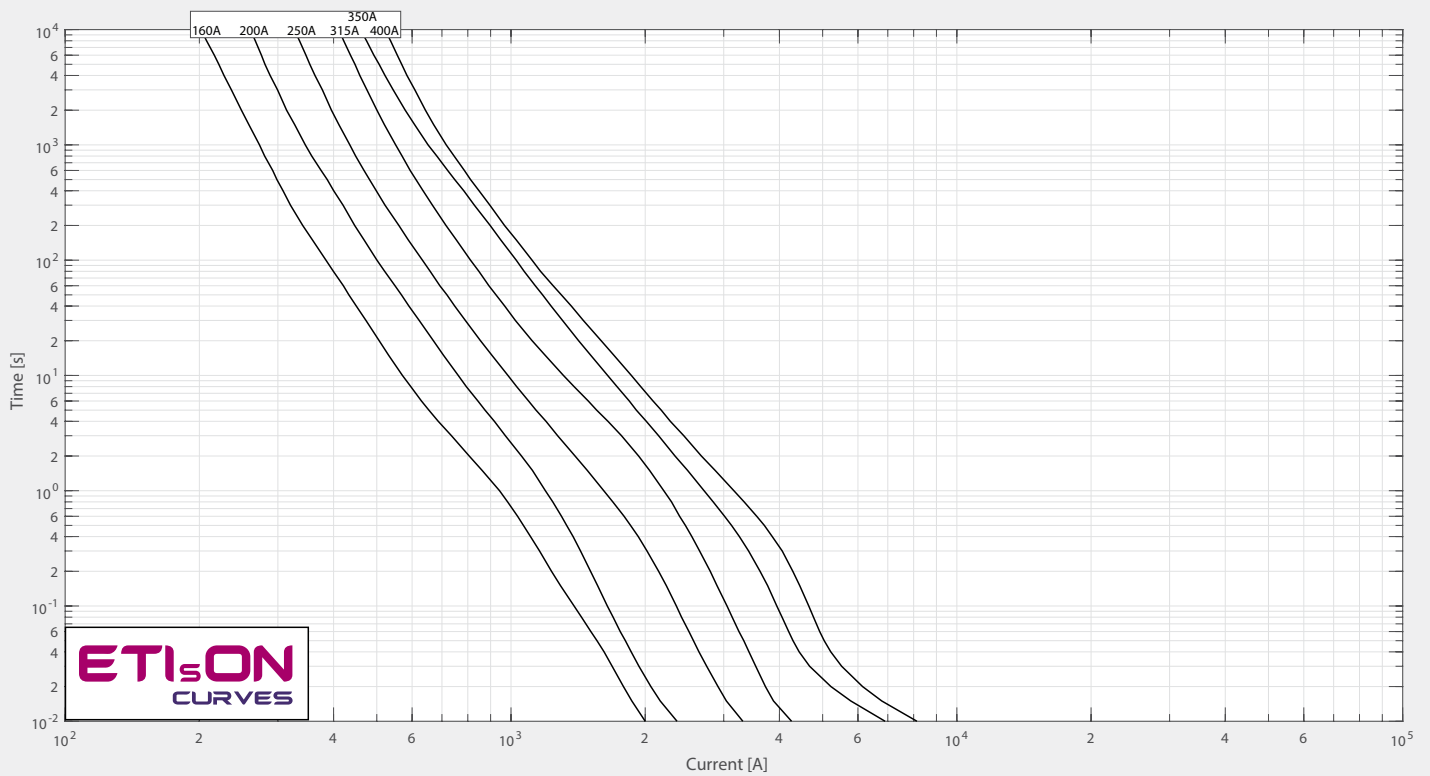
Size	Dimensions [mm]								
	A	B	C	D	E	F	G	H	K
00	79	53	47	35	15	28	56	12	6
1	135	72	65	40	24	46	62	12	6
2	150	72	65	48	30	54	71	12	6
3	150	72	65	60	37	64	84	12	6

I/t characteristics

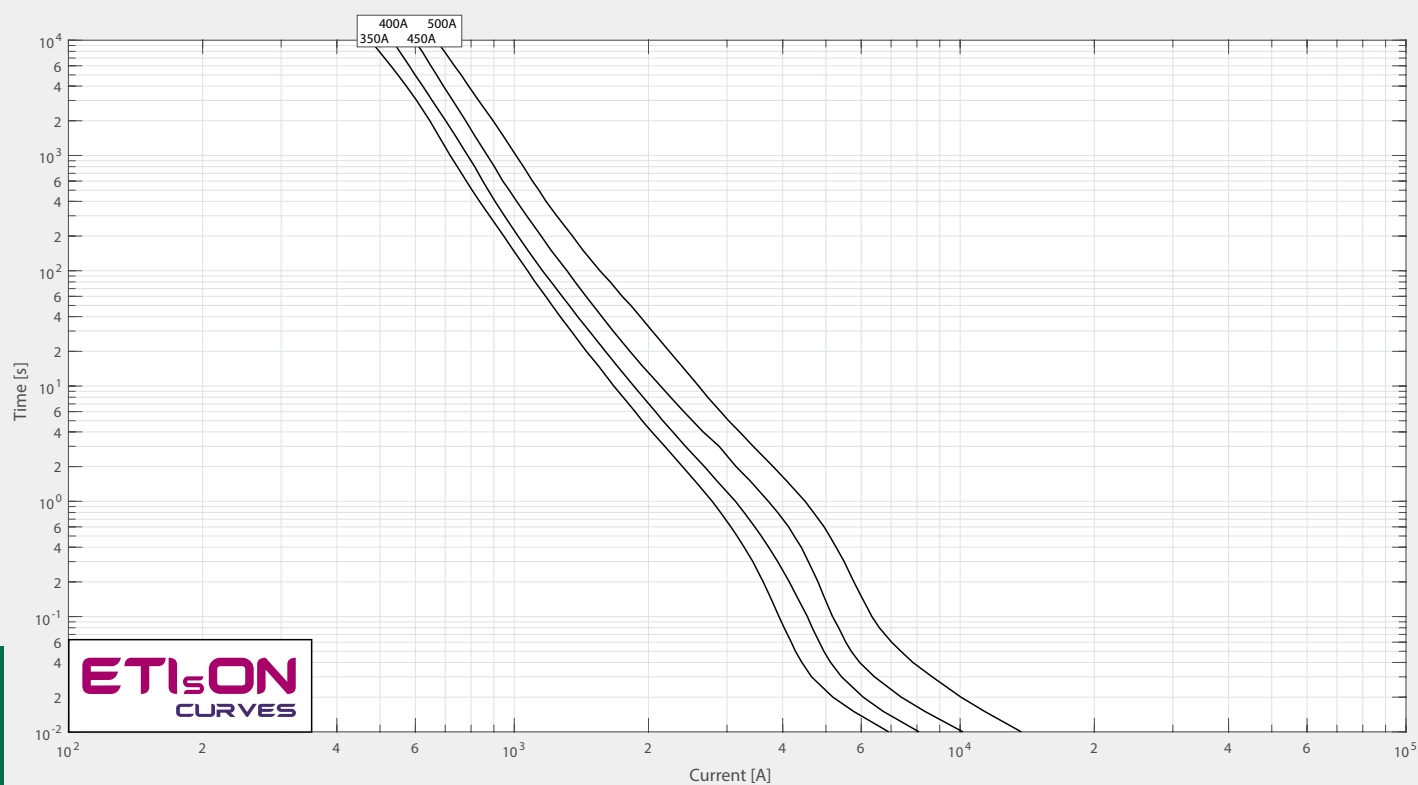
t-I characteristics NH00



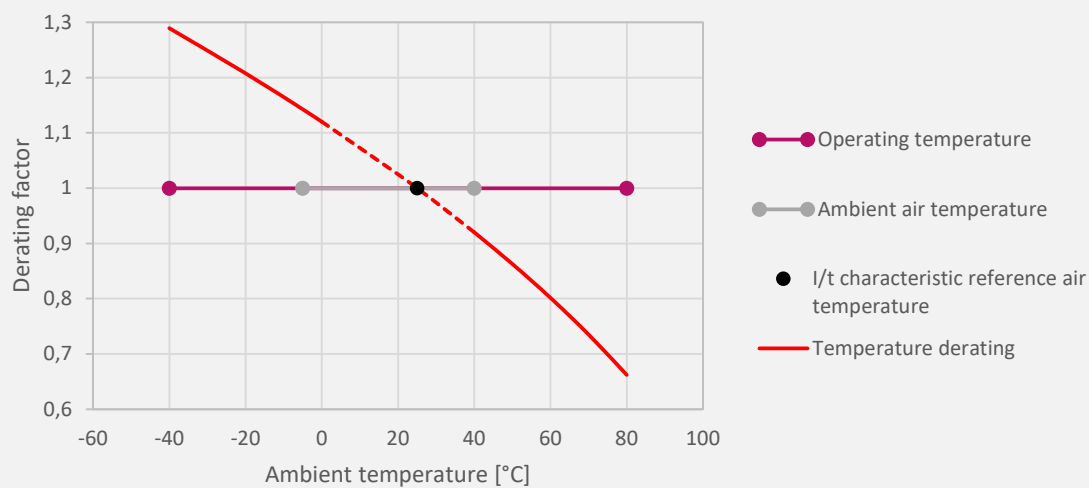
t-I characteristics NH1, NH2



t-I characteristics NH3



Ambient air temperature of fuse-link



Legend:

T_{amb} – Ambient Temperature

TDF – Temperature Derating Factor

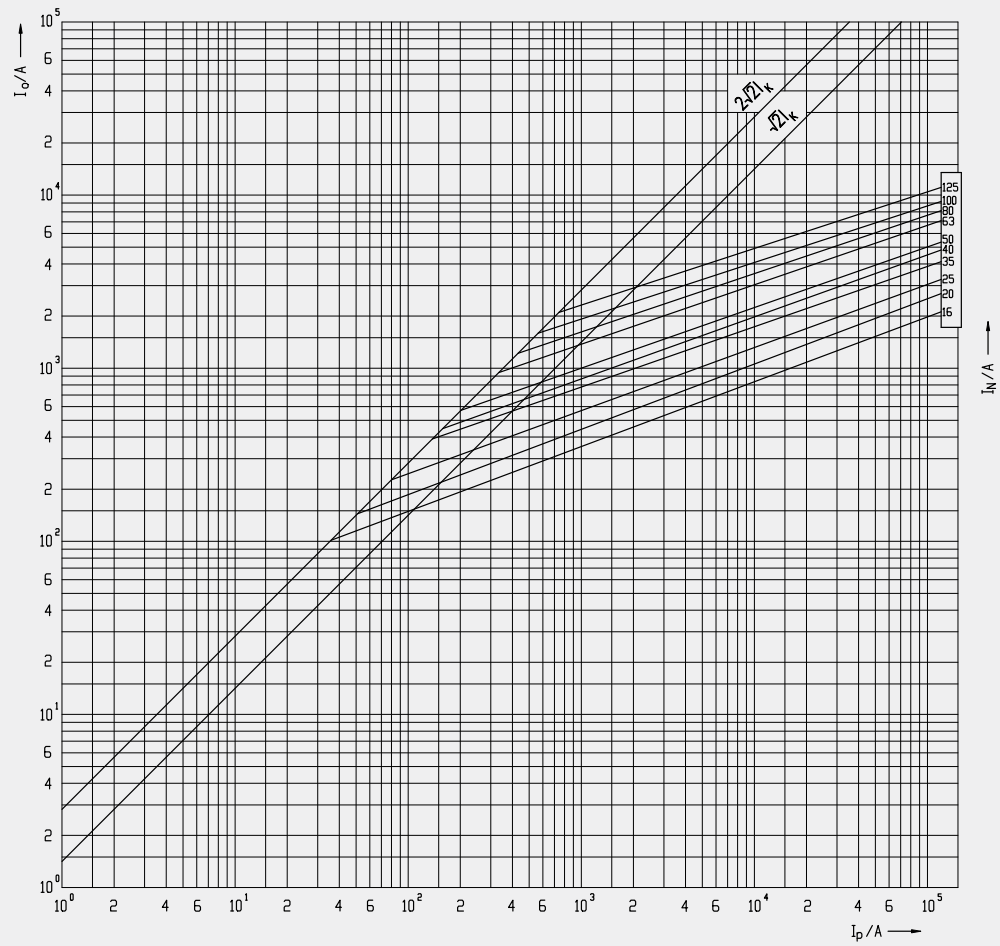
I_N – Nominal Current of Fuse-link

I_{TDF} – Nominal Current Including Temperature Derating Factor

$$\text{Current calculation: } I_{TDF} = I_N \times TDF$$

Cut-off current characteristics

NH00



NH1

