APPLICATION NOTE

Thermal Overload Relays

High temperatures and group mounting

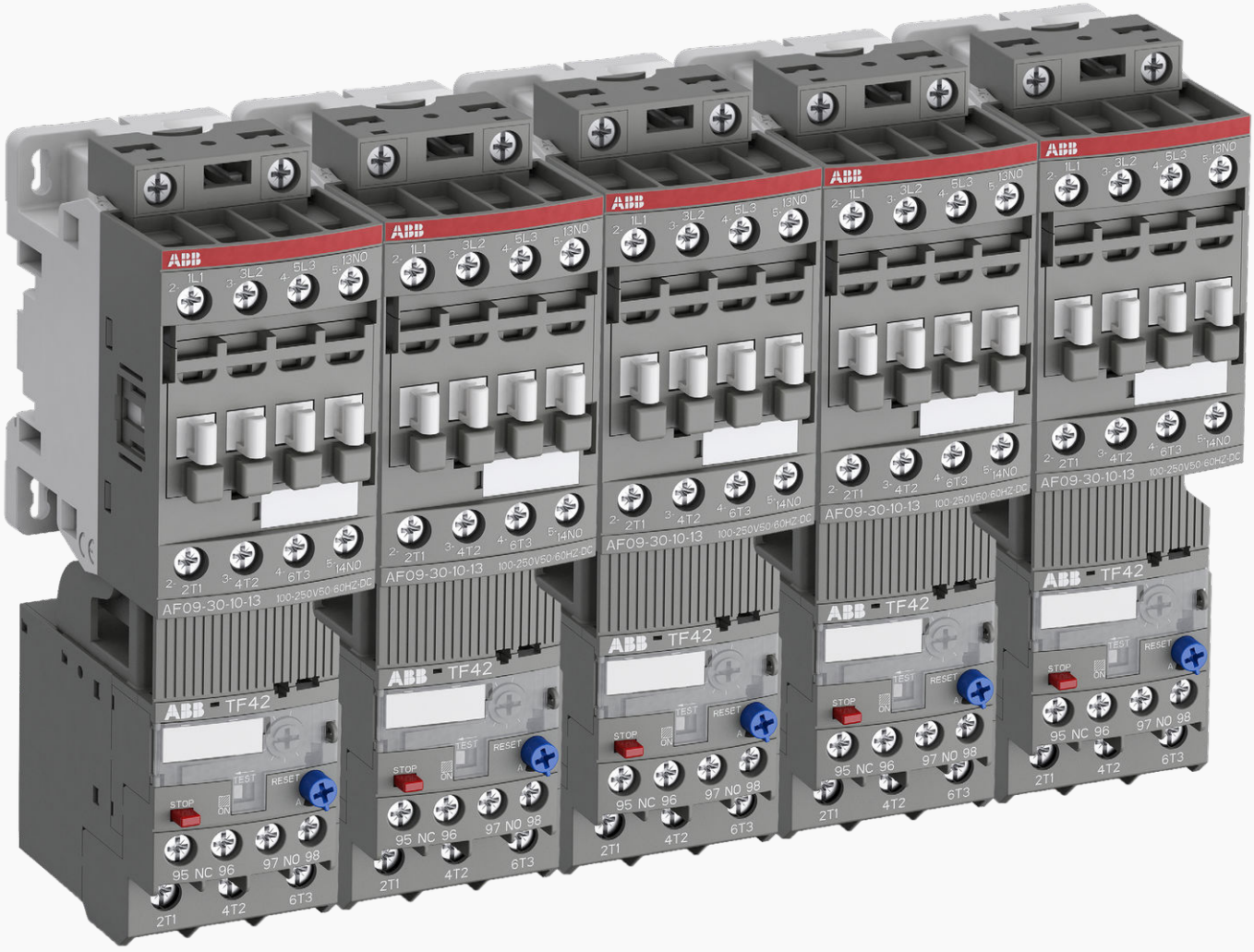


ABB offers a wide range of thermal overload relays.

This application note provides information to aid in the proper use of thermal overload relays in high temperature environments and in group installations.

General information
Group mounting and temperature

ABB's thermal overload relays are designed to meet and exceed requirements of relevant product standards IEC 60947-1, IEC 60947-4-1 as well as UL 60947-4-1 and CAN/CSA-C22.2 No. 60947-4-1.



Requirements from standards
According to mentioned standards it is required to test and validate relevant electrical data (e.g. rated currents, rated frequencies, rated voltages etc.) typically at operating ambient air temperatures of -5 °C up to max. 40 °C.



ABB thermal overload relays standards
ABB's thermal overload relays exceed this requirement by allowing compensated (1) operation in ambient temperature ranges for single mounted products in IEC applications of -25 °C up to 60 °C.
Derated (2) values for the upper limit of the current setting range for ambient temperatures up to 70 °C, for group mounted products shown in below tables. Values between the temperature values can be linear interpolated.



Note
All information provided in this document is only of general nature. Each individual application must be handled as a specific case. Be sure to always follow all national installation regulations/codes for your specific application.



More information
For more information about manual motor starters as well as other ABB products please visit:

www.new.abb.com/low-voltage/products/motor-protection

(1) Temperature compensation applies to bi-metallic devices which employ a secondary bi-metal to counteract the bi-metals of the inverse time-delay overcurrent release. The secondary bi-metal is not heated by the motor current, instead it reacts only under the influence of the ambient air temperature. As a result, the effect of the ambient temperature on the tripping behavior of the thermal overload relay is automatically compensated within the limits acc. to the product standard (for the temperature range -5°C to 40°C) or the product specification (for the extended temperature range. -25 °C ... 60 °C / 70 °C).

(2) Derating in this case aims at ensuring that the product is prevented from heating up to temperatures above the design limit, thereby providing relevant protection in operating conditions for the device. By applying derating in an electrical or electronic component, its' degradation rate is reduced. The reliability and life time expectancy are ensured. Intuitively, if an electrical device is operated below its' design limit, it will be more reliable than if it is operated at or above the design limit.

TF42



TF42

Deratings for IEC applications - mounting with distance ≥ 9 mm and with distance ≥ 50 mm
TF42 + AF(C)09 ... AF(C)38 Contactors

	≥ 9 mm			≥ 50 mm		
	40 °C	**50 °C**	**60 °C**	**40 °C**	**50 °C**	**60 °C**
TF42-0.13	0.13 A	0.13 A	0.13 A	0.13 A	0.13 A	0.13 A
TF42-0.17	0.17 A	0.17 A	0.17 A	0.17 A	0.17 A	0.17 A
TF42-0.23	0.23 A	0.23 A	0.23 A	0.23 A	0.23 A	0.23 A
TF42-0.31	0.31 A	0.31 A	0.31 A	0.31 A	0.31 A	0.31 A
TF42-0.41	0.41 A	0.41 A	0.41 A	0.41 A	0.41 A	0.41 A
TF42-0.55	0.55 A	0.55 A	0.55 A	0.55 A	0.55 A	0.55 A
TF42-0.74	0.74 A	0.74 A	0.74 A	0.74 A	0.74 A	0.74 A
TF42-1.0	1.00 A	1.00 A	1.00 A	1.00 A	1.00 A	1.00 A
TF42-1.3	1.30 A	1.30 A	1.30 A	1.30 A	1.30 A	1.30 A
TF42-1.7	1.70 A	1.70 A	1.70 A	1.70 A	1.70 A	1.70 A
TF42-2.3	2.30 A	2.30 A	2.30 A	2.30 A	2.30 A	2.30 A
TF42-3.1	3.10 A	3.10 A	3.10 A	3.10 A	3.10 A	3.10 A
TF42-4.2	4.20 A	4.20 A	4.20 A	4.20 A	4.20 A	4.20 A
TF42-5.7	5.70 A	5.70 A	5.70 A	5.70 A	5.70 A	5.70 A
TF42-7.6	7.60 A	7.60 A	7.60 A	7.60 A	7.60 A	7.60 A
TF42-10	10 A	10 A	10 A	10 A	10 A	10 A
TF42-13	13 A	13 A	13 A	13 A	13 A	13 A
TF42-16	16 A	16 A	16 A	16 A	16 A	16 A
TF42-20	20 A	20 A	20 A	20 A	20 A	20 A
TF42-24	24 A	24 A	24 A	24 A	24 A	24 A
TF42-29	29 A	29 A	28 A	29 A	29 A	29 A
TF42-35	35 A	35 A	34 A	35 A	35 A	35 A
TF42-38	38 A	37 A	36 A	38 A	38 A	38 A

TF42



TF42

Deratings for IEC applications - group mounting (side by side, distance < 9 mm) TF42 + AF(C)09 ... AF(C)38 Contactors

	40 °C	50 °C	60 °C
TF42-0.13	0.13 A	0.13 A	0.13 A
TF42-0.17	0.17 A	0.17 A	0.17 A
TF42-0.23	0.23 A	0.23 A	0.23 A
TF42-0.31	0.31 A	0.31 A	0.31 A
TF42-0.41	0.41 A	0.41 A	0.41 A
TF42-0.55	0. 55 A	0.55 A	0.55 A
TF42-0.74	0.74 A	0.74 A	0.74 A
TF42-1.0	1.00 A	1.00 A	1.00 A
TF42-1.3	1.30 A	1.30 A	1.30 A
TF42-1.7	1.70 A	1.70 A	1.70 A
TF42-2.3	2.30 A	2.30 A	2.30 A
TF42-3.1	3.10 A	3.10 A	3.10 A
TF42-4.2	4.20 A	4.20 A	4.20 A
TF42-5.7	5.70 A	5.70 A	5.70 A
TF42-7.6	7.60 A	7.60 A	7.60 A
TF42-10	10 A	10 A	10 A
TF42-13	13 A	13 A	12.5 A
TF42-16	16 A	16 A	15.5 A
TF42-20	18 A	18 A	16 A
TF42-24	22 A	22 A	20 A
TF42-29	27 A	27 A	25 A
TF42-35	29 A	29 A	(1)
TF42-38	36< A	-	-

(1) When using 10 mm² conductor: 29 A

TF65



TF65

Deratings for IEC applications - mounting with distance ≥ 10 mm and with distance ≥ 40 mm
TF65 + AF(C)40 ... AF(C)65 Contactors

	≥ 10 mm			≥ 40 mm		
	40 °C	**60 °C**	**70 °C**	**40 °C**	**60 °C**	**70 °C**
TF65-28	28 A	28 A	28 A	28 A	28 A	28 A
TF65-33	33 A	33 A	30 A (1)	33 A	33 A	33 A
TF65-40	40 A	40 A	39 A	40 A	40 A	40 A
TF65-47	47 A	47 A	45 A	47 A	47 A	47 A
TF65-53	53 A	53 A	53 A	53 A	53 A	53 A
TF65-60	60 A	60 A	58 A	60 A	60 A	58 A
TF65-67	67 A	67 A	62 A (3)	67 A	67 A	66 A

Deratings for IEC applications - group mounting (side by side, distance < 10 mm)
TF65 + AF(C)40 ... AF(C)65 Contactors

	40 °C	**60 °C**	**70 °C**
TF65-28	28 A	28 A	27 A
TF65-33	30 A (1)	30 A (1)	28 A (2)
TF65-40	40 A	37 A	35 A
TF65-47	45 A	43 A	41 A
TF65-53	53 A	53 A	50 A
TF65-60	56 A	56 A	52 A
TF65-67	62 A (4)	60 A (3)	57 A (5)

(1) When using 10 mm² conductor: 33 A
(2) When using 10 mm² conductor: 30 A
(3) When using 25 mm² conductor: 65 A
(4) When using 25 mm² conductor: 67 A
(5) When using 25 mm² conductor: 60 A

TF96



TF96

Deratings IEC applications - mounting with distance ≥ 10 mm and with distance ≥ 40 mm
TF96 + AF80, AF96 Contactors

	≥ 10 mm			≥ 40 mm		
	40 °C	**60 °C**	**70 °C**	**40 °C**	**60 °C**	**70 °C**
TF96-51	51 A	51 A	51 A	51 A	51 A	51 A
TF96-60	60 A	60 A	60 A	60 A	60 A	60 A
TF96-68	68 A	68 A	68 A	68 A	68 A	68 A
TF96-78	78 A	78 A	77 A	78 A	78 A	78 A
TF96-87	87 A	87 A	85 A	87 A	87 A	87 A
TF96-96	96 A	88 A	-	96 A	96 A	92 A (1)

Deratings IEC applications - group mounting (side by side, distance < 10 mm)
TF96 + AF80, AF96 Contactors

	40 °C	**60 °C**	**70 °C**
TF96-51	51 A	51 A	51 A
TF96-60	60 A	60 A	60 A
TF96-68	68 A	68 A	68 A
TF96-78	78 A	78 A	74 A
TF96-87	87 A	83 A (2)	77 A (3)
TF96-96	96 A	84 A (4)	-

(1) at distance ≥ 80 mm: 96 A
(2) when using 35 mm^2 conductor: 85 A
(3) when using 35 mm^2 conductor: 79 A
(4) only when using 35 mm^2 conductor

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You can find the address of your local sales organization on the ABB homepage

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