

# Thermal Overload Relays

Tripping Class 20

**New**



**ABB**

## Motor Protection — general

It is very important to choose an adequate protective device for the safety of the motor during operation and for its durability. The efficiency of protection methods varies according to the application. The overview below will help you to choose. There is no general rule and we are available to advise you for special applications and especially in the case of difficult starting. An economic and effective protection are thermal overload relays with protection against:

- > Overload
- > Phase failure imbalance
- > Phase loss

## Description

- Available for starter construction with A Line contactors and separate panel mounting
- Designed for close couple mounting – separate base mounting available for all overload relays
- Full automatic function, Manual reset, Test phase or Reset can also be adjusted to function as a stop button
- Remote trip and reset option available
- Screwdriver guide holes, all terminal screws are available from the front
- Trip indication
- Ambient compensation -25 °C to +55 °C (-13 °F to +131 °F)

## Tripping classes of the thermal overload relays

Standard tripping classes are 10 A, 10, 20, 30. The tripping class indicates according to IEC 60947-4-1 the maximum tripping time in seconds under specified conditions of test at 7.2 times the setting current and specifies tripping and non tripping times for 1.5 and 7.2 times the setting current.

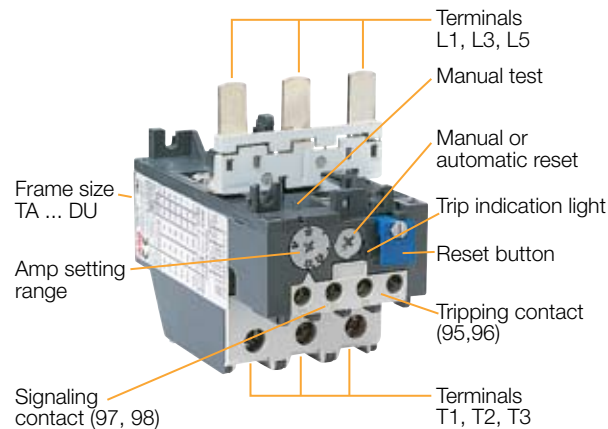
## Construction and function

### • General

Thermal O/L relays and their accessories meet UL, NEMA, CSA and most other important international standards (IEC), European standards (EN) and the most important national standards. They meet the certification and approval directives required throughout the world.

Thermal overload relays are 3 pole. The motor current flows through their bimetals (1 per phase) which are indirectly heated. Under the effect of the heating, the bimetals bend, cause the relay to trip and the position of the auxiliary contacts to change. The relay setting range is graduated in amps. In compliance with international and national standards, the setting current is the motor nominal current and not the tripping current (no tripping at 1.05 x setting current, tripping at 1.2 x setting current). The tripping curves (cold or warm starting, 3 phases and 2 phases) are shown in the main catalog.

The relays are built to be self protecting in the event of an overload until the short circuit protection device is activated.



## Function of the thermal overload relays

| Press blue button | Contacts             | Relay tripped                 |                | Relay not tripped  |  |
|-------------------|----------------------|-------------------------------|----------------|--|--|
|                   |                      | Manual                        | Automatic      | Manual   | Automatic  |
|                   | NC 95-96<br>NO 97-98 | open<br>closed                | open<br>closed | closed<br>open   | closed<br>open   |
| Button R          | NC 95-96             | Reset                         | –              | –  | –  |
|                   | NO 97-98             | closes when Button's pressed  | –              | –  | –  |
| Button R/O        |                      | Reset                         | –              | –  | –  |
|                   | NC 95-96             | closes when Button's released | –              | opens when Button's pressed<br>closes when Button's released | opens when Button's pressed<br>closes when Button's released |
|                   | NO 97-98             | opens when Button's pressed   | –              | –  | –  |

# Thermal Overload Relays with Trip Class 20

Ordering data for the "New additional Assortment"



TA25DU



TA42DU

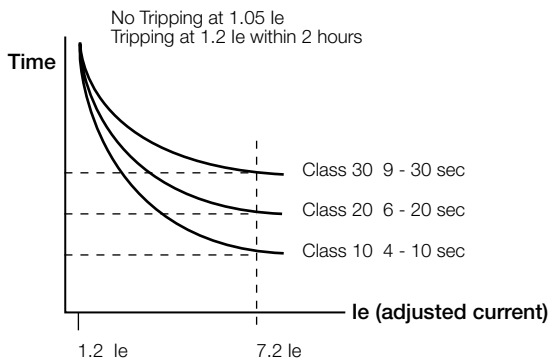


TA75DU



TA80DU

| Ordering Details   | Order code      | Setting range<br>A ... A | UL<br>Fuse/<br>600V/K5<br>A | Packing<br>unit<br>piece | List<br>Price |
|--|-----------------|--------------------------|-----------------------------|--------------------------|---------------|
| <b>TA25DU trip class 20 for contactors A9 ... A40 and (T) AL9 ... (T) AL30</b> |                 |                          |                             |                          |               |
| TA25DU1.8-20   | 1SAZ211401R1025 | 1.3 ... 1.8              | 6                           | 1                        | \$ 63         |
| TA25DU2.4-20   | 1SAZ211401R1028 | 1.7 ... 2.4              | 10                          | 1                        |               |
| TA25DU3.1-20   | 1SAZ211401R1031 | 2.2 ... 3.1              | 10                          | 1                        |               |
| TA25DU4.0-20   | 1SAZ211401R1033 | 2.8 ... 4.0              | 15                          | 1                        |               |
| TA25DU5.0-20   | 1SAZ211401R1035 | 3.5 ... 5.0              | 20                          | 1                        |               |
| TA25DU6.5-20   | 1SAZ211401R1038 | 4.5 ... 6.5              | 25                          | 1                        |               |
| TA25DU8.5-20   | 1SAZ211401R1040 | 6.0 ... 8.5              | 35                          | 1                        |               |
| TA25DU11-20  | 1SAZ211401R1043 | 7.5 ... 11               | 45                          | 1                        |               |
| TA25DU14-20  | 1SAZ211401R1045 | 10 ... 14                | 60                          | 1                        |               |
| TA25DU19-20  | 1SAZ211401R1047 | 13 ... 19                | 60                          | 1                        |               |
| TA25DU25-20  | 1SAZ211401R1051 | 18 ... 25                | 70                          | 1                        |               |
| TA25DU32-20 <sup>(1)</sup>   | 1SAZ211401R1053 | 24 ... 32 <sup>(1)</sup> | 100                         | 1                        |               |
| <sup>(1)</sup> with terminal block DX25: 1x16mm <sup>2</sup>                   |                 |                          |                             |                          |               |
| <b>TA42DU trip class 20 for contactors A30, A40 and (T) AL30, (T) AL40</b>     |                 |                          |                             |                          |               |
| TA42DU25-20  | 1SAZ311401R1001 | 18 ... 25                | 80                          | 1                        | \$ 78         |
| TA42DU32-20  | 1SAZ311401R1002 | 22 ... 32                | 100                         | 1                        |               |
| TA42DU42-20  | 1SAZ311401R1003 | 29 ... 42                | 150                         | 1                        |               |
| <b>TA75DU trip class 20 for contactors A50 ... A75 and AE50 ... AE75</b>       |                 |                          |                             |                          |               |
| TA75DU25-20  | 1SAZ321401R1001 | 18 ... 25                | 80                          | 1                        | \$ 102        |
| TA75DU32-20  | 1SAZ321401R1002 | 22 ... 32                | 100                         | 1                        |               |
| TA75DU42-20  | 1SAZ321401R1003 | 29 ... 42                | 150                         | 1                        |               |
| TA75DU52-20  | 1SAZ321401R1004 | 36 ... 52                | 175                         | 1                        |               |
| TA75DU63-20  | 1SAZ321401R1005 | 45 ... 63                | 200                         | 1                        |               |
| TA75DU80-20  | 1SAZ321401R1006 | 60 ... 80                | 250                         | 1                        |               |
| <b>TA80DU trip class 20 for contactors A95, A110, AE 95 and AE110</b>          |                 |                          |                             |                          |               |
| TA80DU42-20  | 1SAZ331401R1003 | 29 ... 42                | 150                         | 1                        | \$ 135        |
| TA80DU52-20  | 1SAZ331401R1004 | 36 ... 52                | 175                         | 1                        |               |
| TA80DU63-20  | 1SAZ331401R1005 | 45 ... 63                | 200                         | 1                        |               |
| TA80DU80-20  | 1SAZ331401R1006 | 60 ... 80                | 250                         | 1                        |               |



# Thermal Overload Relays with Trip Class 20

Resistances and power losses per phase

Short-circuit protection

| Setting range<br>from ... to<br>A      A           | Short-circuit protection (fuses)            |   | UL<br><br>Fuse/600V<br>K5<br>A | UL<br><br>600V<br>CB<br>A | Resistance<br>per phase<br><br>mOhm | Power loss<br>per phase<br><br>at upper<br>current setting<br>W |
|--|---|---|--------------------------------|---------------------------|-------------------------------------|---|
|  | Type „2“<br>co-ordination<br><br>gL/gG<br>A | Type „1“<br>co-ordination<br><br>gL/gG<br>A |                                |                           |                                     |   |
| <b>Thermal overload relay TA25DU trip class 20</b> |   |   |                                |                           |                                     |   |
| 1.3 ... 1.8  | 10  | 25  | 6                              | -                         | 670.3                               | 2.2   |
| 1.7 ... 2.4  | 16  | 25  | 10                             | -                         | 381                                 | 2.2   |
| 2.2 ... 3.1  | 16  | 25  | 10                             | -                         | 235.3                               | 2.3   |
| 2.8 ... 4.0  | 20  | 25  | 15                             | -                         | 140.7                               | 2.3   |
| 3.5 ... 5.0  | 25  | 25  | 20                             | -                         | 91.2                                | 2.3   |
| 4.5 ... 6.5  | 25  | 25  | 25                             | -                         | 54.5                                | 2.3   |
| 6.0 ... 8.5  | 32  | 32  | 35                             | -                         | 32.1                                | 2.3   |
| 7.5 ... 11   | 40  | 40  | 45                             | -                         | 15.5                                | 1.9   |
| 10 ... 14  | 50  | 50  | 60                             | -                         | 12                                  | 2.4   |
| 13 ... 19  | 63  | 63  | 60                             | -                         | 6.3                                 | 2.3   |
| 18 ... 25  | 80  | 80  | 70                             | -                         | 4.7                                 | 3.0   |
| 24 ... 32  | 100   | 100   | 100                            | -                         | 3.2                                 | 3.3   |
| <b>Thermal overload relay TA42DU trip class 20</b> |   |   |                                |                           |                                     |   |
| 18 ... 25  | 100   | 160   | 80                             | 80                        | 5.5                                 | 3.43  |
| 22 ... 32  | 125   | 160   | 100                            | 80                        | 2.89                                | 2.91  |
| 29 ... 42  | 160   | 160   | 150                            | 80                        | 1.84                                | 3.24  |
| <b>Thermal overload relay TA75DU trip class 20</b> |   |   |                                |                           |                                     |   |
| 18 ... 25  | 100   | 160   | 80                             | 80                        | 5.5                                 | 3.43  |
| 22 ... 32  | 125   | 160   | 100                            | 80                        | 2.89                                | 2.91  |
| 29 ... 42  | 160   | 160   | 150                            | 80                        | 1.84                                | 3.24  |
| 36 ... 52  | 200   | 200   | 175                            | 125                       | 1.3                                 | 3.51  |
| 45 ... 63  | 200   | 250   | 200                            | 125                       | 0.936                               | 3.72  |
| 60 ... 80  | 250   | 250   | 250                            | 125                       | 0.615                               | 3.94  |
| <b>Thermal overload relay TA80DU trip class 20</b> |   |   |                                |                           |                                     |   |
| 29 ... 42  | 160   | 160   | 150                            | 80                        | 1.84                                | 3.24  |
| 36 ... 52  | 200   | 200   | 175                            | 125                       | 1.3                                 | 3.51  |
| 45 ... 63  | 200   | 250   | 200                            | 125                       | 0.936                               | 3.72  |
| 60 ... 80  | 250   | 250   | 250                            | 150                       | 0.615                               | 3.94  |

Type „1“ co-ordination according to IEC 60947-4-1: Under short-circuit conditions, the starter shall cause no danger to persons or installation and may not be suitable for further service without repair and replacement of parts.

Type „2“ co-ordination according to IEC 60947-4-1: Under short-circuit conditions, the contactor or starter shall cause no danger to persons or installation and shall be suitable for further use. The risk of contact welding is recognized, in which case the manufacturer shall indicate the measures to be taken as regards the maintenance of the equipment

**Standard technical data, operating data and dimensions see TA...Relay Main Catalog**

# Thermal Overload Relays with Trip Class 20

## Technical data

### Short-circuit ratings

| Voltage<br>480 V | Type          | Setting range<br>A ... A | 5 kA    |     | 10 kA   |    | 18 kA   |    |
|------------------|---------------|--------------------------|---------|-----|---------|----|---------|----|
|                  |               |                          | Fuse K5 | CB  | Fuse K5 | CB | Fuse K5 | CB |
| TA25DU           | TA25DU-1.8-20 | 1.3 ... 1.8              | 6       | -   | 6       | -  | 6       | -  |
|                  | TA25DU-2.4-20 | 1.7 ... 2.4              | 10      | -   | 10      | -  | 10      | -  |
|                  | TA25DU-3.1-20 | 2.2 ... 3.1              | 10      | -   | 10      | -  | 10      | -  |
|                  | TA25DU-4.0-20 | 2.8 ... 4.0              | 15      | -   | 15      | -  | 15      | -  |
|                  | TA25DU-5.0-20 | 3.5 ... 5.0              | 20      | -   | 20      | -  | 20      | -  |
|                  | TA25DU-6.5-20 | 4.5 ... 6.5              | 25      | -   | 25      | -  | 25      | -  |
|                  | TA25DU-8.5-20 | 6.0 ... 8.5              | 35      | -   | 35      | -  | 35      | -  |
|                  | TA25DU-11-20  | 7.5 ... 11               | 45      | -   | 45      | -  | 45      | -  |
|                  | TA25DU-14-20  | 10 ... 14                | 60      | -   | 60      | -  | 60      | -  |
|                  | TA25DU-19-20  | 13 ... 19                | 60      | -   | 60      | -  | 60      | -  |
|                  | TA25DU-25-20  | 18 ... 25                | 70      | -   | 70      | -  | 70      | -  |
|                  | TA25DU-32-20  | 24 ... 32                | 100     | -   | 100     | -  | 100     | -  |
| TA42DU           | TA42DU-25-20  | 18 ... 25                | 80      | 80  | 80      | -  | 150     | -  |
|                  | TA42DU-32-20  | 22 ... 32                | 100     | 80  | 100     | -  | 150     | -  |
|                  | TA42DU-42-20  | 29 ... 42                | 150     | 80  | 150     | -  | 200     | -  |
| TA75DU           | TA75DU-25-20  | 18 ... 25                | 80      | 80  | 80      | -  | 150     | -  |
|                  | TA75DU-32-20  | 22 ... 32                | 100     | 80  | 100     | -  | 150     | -  |
|                  | TA75DU-42-20  | 29 ... 42                | 150     | 80  | 150     | -  | 200     | -  |
|                  | TA75DU-52-20  | 36 ... 52                | 175     | 125 | 175     | -  | 250     | -  |
|                  | TA75DU-63-20  | 45 ... 63                | 200     | 125 | 200     | -  | 250     | -  |
|                  | TA75DU-80-20  | 60 ... 80                | 250     | 125 | 250     | -  | 250     | -  |
| TA80DU           | TA80DU-42-20  | 29 ... 42                | 150     | 80  | 150     | -  | 150     | -  |
|                  | TA80DU-52-20  | 36 ... 52                | 175     | 125 | 175     | -  | 175     | -  |
|                  | TA80DU-63-20  | 45 ... 63                | 200     | 125 | 200     | -  | 250     | -  |
|                  | TA80DU-80-20  | 60 ... 80                | 250     | 150 | 250     | -  | 250     | -  |

| Voltage<br>600 V | Type          | Setting range<br>A ... A | 5 kA    |     | 10 kA   |    | 18 kA   |    |
|------------------|---------------|--------------------------|---------|-----|---------|----|---------|----|
|                  |               |                          | Fuse K5 | CB  | Fuse K5 | CB | Fuse K5 | CB |
| TA25DU           | TA25DU-1.8-20 | 1.3 ... 1.8              | 6       | -   | 6       | -  | 6       | -  |
|                  | TA25DU-2.4-20 | 1.7 ... 2.4              | 10      | -   | 10      | -  | 10      | -  |
|                  | TA25DU-3.1-20 | 2.2 ... 3.1              | 10      | -   | 10      | -  | 10      | -  |
|                  | TA25DU-4.0-20 | 2.8 ... 4.0              | 15      | -   | 15      | -  | 15      | -  |
|                  | TA25DU-5.0-20 | 3.5 ... 5.0              | 20      | -   | 20      | -  | 20      | -  |
|                  | TA25DU-6.5-20 | 4.5 ... 6.5              | 25      | -   | 25      | -  | 25      | -  |
|                  | TA25DU-8.5-20 | 6.0 ... 8.5              | 35      | -   | 35      | -  | 35      | -  |
|                  | TA25DU-11-20  | 7.5 ... 11               | 45      | -   | 45      | -  | 45      | -  |
|                  | TA25DU-14-20  | 10 ... 14                | 60      | -   | 60      | -  | 60      | -  |
|                  | TA25DU-19-20  | 13 ... 19                | 60      | -   | 60      | -  | 60      | -  |
|                  | TA25DU-25-20  | 18 ... 25                | 70      | -   | 70      | -  | 70      | -  |
|                  | TA25DU-32-20  | 24 ... 32                | 100     | -   | 100     | -  | 100     | -  |
| TA42DU           | TA42DU-25-20  | 18 ... 25                | 80      | 80  | 80      | -  | 150     | -  |
|                  | TA42DU-32-20  | 22 ... 32                | 100     | 80  | 100     | -  | 150     | -  |
|                  | TA42DU-42-20  | 29 ... 42                | 150     | 80  | 150     | -  | 200     | -  |
| TA75DU           | TA75DU-25-20  | 18 ... 25                | 80      | 80  | 80      | -  | 150     | -  |
|                  | TA75DU-32-20  | 22 ... 32                | 100     | 80  | 100     | -  | 150     | -  |
|                  | TA75DU-42-20  | 29 ... 42                | 150     | 80  | 150     | -  | 150     | -  |
|                  | TA75DU-52-20  | 36 ... 52                | 175     | 125 | 175     | -  | 175     | -  |
|                  | TA75DU-63-20  | 45 ... 63                | 200     | 125 | 200     | -  | 250     | -  |
|                  | TA75DU-80-20  | 60 ... 80                | 250     | 125 | 250     | -  | 250     | -  |
| TA80DU           | TA80DU-42-20  | 29 ... 42                | 150     | 80  | 150     | -  | 150     | -  |
|                  | TA80DU-52-20  | 36 ... 52                | 175     | 125 | 175     | -  | 175     | -  |
|                  | TA80DU-63-20  | 45 ... 63                | 200     | 125 | 200     | -  | 250     | -  |
|                  | TA80DU-80-20  | 60 ... 80                | 250     | 150 | 250     | -  | 250     | -  |

# Thermal Overload Relays with Trip Class 20

## Table for tripping time

Tripping times of thermal overload relays as a function of a multiple of the setting current from cold state (tolerance +/- 20% of the tripping time).

| Setting range      | Tripping times of thermal overload relays:<br>at multiple of setting current |   |   |   |     |   |
|--------------------|--|---|---|---|-----|---|
|                    | 3  | 4 | 5 | 6 | 7.2 | 8 |
| from ... to<br>A A | Tripping times in sec  |   |   |   |     |   |

| Thermal overload relays TA25DU trip class 20 |      |    |      |      |      |      |
|--|------|----|------|------|------|------|
| 1.3 ... 1.8                                  | 47.1 | 27 | 20.3 | 15.8 | 12.7 | 11.5 |
| 1.7 ... 2.4                                  | 43.3 | 25 | 18.9 | 14.4 | 11.9 | 10.4 |
| 2.2 ... 3.1                                  | 47.5 | 28 | 20.8 | 16   | 13.1 | 11.8 |
| 2.8 ... 4.0                                  | 45.6 | 27 | 19.8 | 15.3 | 12.5 | 11   |
| 3.5 ... 5.0                                  | 47.8 | 29 | 21.2 | 16   | 13.2 | 11.8 |
| 4.5 ... 6.5                                  | 47.4 | 28 | 20.3 | 15.5 | 12.5 | 11   |
| 6.0 ... 8.5                                  | 46.1 | 27 | 20   | 15   | 11.7 | 10   |
| 7.5 ... 11                                   | 42.3 | 25 | 17.8 | 14.1 | 10.9 | 10.5 |
| 10 ... 14                                    | 39.4 | 25 | 16.8 | 13   | 9.9  | 8.5  |
| 13 ... 19                                    | 38.1 | 21 | 13.6 | 10   | 7.4  | 6.2  |
| 18 ... 25                                    | 44.4 | 25 | 16.1 | 11   | 9    | 8    |
| 24 ... 32                                    | 44.4 | 27 | 17.7 | 13   | 9.8  | 8.5  |

| Thermal overload relays TA42DU, TA75DU, TA80DU trip class 20 |      |    |      |    |      |      |
|--|------|----|------|----|------|------|
| 18 ... 25  | 51.6 | 29 | 20.3 | 15 | 11.7 | 10   |
| 22 ... 32  | 67.9 | 38 | 26.9 | 20 | 14.8 | 12.5 |
| 29 ... 42  | 58.8 | 33 | 22.5 | 16 | 12.2 | 10.3 |
| 36 ... 52  | 59.9 | 34 | 22.7 | 16 | 12.3 | 10.5 |
| 45 ... 63  | 65.8 | 34 | 22.4 | 16 | 12.4 | 10.5 |
| 60 ... 80  | 71.9 | 35 | 23.4 | 17 | 13.9 | 12   |



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