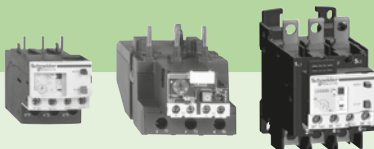


**Thermal overload relays - For use with TeSys K contactors**

| Type of product                                                         | Range             |                                                                                     | Pages |
|-------------------------------------------------------------------------|-------------------|-------------------------------------------------------------------------------------|-------|
| Adjustable thermal overload relays<br>For motors<br>TeSys LRK           | From 0.16 to 16 A |  | B11/2 |
| Adjustable thermal overload relays<br>For unbalanced loads<br>TeSys LRK | From 0.8 to 16 A  |                                                                                     | B11/3 |

**Thermal overload relays Class 10 A - For use with TeSys D contactors**

|                                                                         |                    |                                                                                    |       |
|-------------------------------------------------------------------------|--------------------|------------------------------------------------------------------------------------|-------|
| Adjustable thermal overload relays<br>For motors<br>TeSys LRD           | From 0.16 to 140 A |  | B11/4 |
| Adjustable thermal overload relays<br>For unbalanced loads<br>TeSys LRD | From 0.16 to 140 A |                                                                                    | B11/4 |

**Thermal overload relays Class 20 - For use with TeSys D contactors**

|                                                                         |                   |                                                                                     |       |
|-------------------------------------------------------------------------|-------------------|-------------------------------------------------------------------------------------|-------|
| Adjustable thermal overload relays<br>For motors<br>TeSys LRD           | From 0.63 to 80 A |  | B11/6 |
| Adjustable thermal overload relays<br>For unbalanced loads<br>TeSys LRD | From 0.63 to 32 A |                                                                                     | B11/6 |

**Electronic thermal overload relays - For use with TeSys D contactors**

|                                                                                 |                   |                                                                                       |        |
|---------------------------------------------------------------------------------|-------------------|---------------------------------------------------------------------------------------|--------|
| Adjustable electronic overload relay,<br>Multi-class, multi-scale<br>TeSys LR9D | From 0.1 to 150 A |  | B11/10 |
|---------------------------------------------------------------------------------|-------------------|---------------------------------------------------------------------------------------|--------|

**Electronic thermal overload relays - For use with TeSys F contactors**

|                                                                                      |                  |                                                                                       |        |
|--------------------------------------------------------------------------------------|------------------|---------------------------------------------------------------------------------------|--------|
| Compensated and differential overload<br>relays, with or without alarm<br>TeSys LR9F | From 50 to 630 A |  | B11/11 |
|--------------------------------------------------------------------------------------|------------------|---------------------------------------------------------------------------------------|--------|

**Single pole magnetic over current relays**

|                                                       |                    |                                                                                       |        |
|-------------------------------------------------------|--------------------|---------------------------------------------------------------------------------------|--------|
| Latching or non latching overload relays<br>TeSys RM1 | From 1.15 to 630 A |  | B11/15 |
|-------------------------------------------------------|--------------------|---------------------------------------------------------------------------------------|--------|

**Thermistor-type protection units – For use detection of motor overheating**

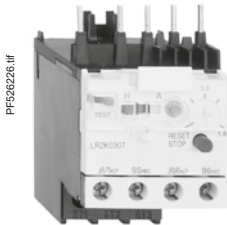
|                                                                               |                   |                                                                                       |        |
|-------------------------------------------------------------------------------|-------------------|---------------------------------------------------------------------------------------|--------|
| Protection units and PTC probes,<br>with or without fault memory<br>TeSys LT3 | From 90 to 170 °C |  | B11/17 |
|-------------------------------------------------------------------------------|-------------------|---------------------------------------------------------------------------------------|--------|

**Electronic over current relays - For machine protection**

|                                                          |                  |                                                                                       |        |
|----------------------------------------------------------|------------------|---------------------------------------------------------------------------------------|--------|
| Predefined or adjustable starting times,<br>Manual reset | From 1.5 to 34 A |  | B11/19 |
| Automatic, electric or manual reset                      | From 0.5 to 50 A |  | B11/19 |

Overload relays

Thermal overload relays for TeSys K contactors - adjustable from 0.11 to 16 A Class 10 A



LR2K0307

3-pole relays with screw clamp terminals

These overload relays are designed for the protection of motors. They are compensated and phase failure sensitive. Resetting can either be manual or automatic.

Direct mounting: under the contactor for versions with screw clamp terminals only; pre-wired terminals, see pages B11/28 and B11/30.

Separate mounting: using terminal block LA7K0064 (see below).

On the front face of the overload relay:

- selection of reset mode: Manual (marked H) or Automatic (marked A),
- red pushbutton: Trip Test function,
- blue pushbutton: Stop and manual Reset,
- yellow trip flag indicator: overload relay tripped.

Protection by magnetic circuit breaker GV2LE, see pages A6/11 and A6/20.

Class 10 A (the standard specifies a tripping time of between 2 and 10 seconds at 7.2 In)

| Relay setting range | Fuses to be used with selected relay |     |      | Reference |
|---------------------|--------------------------------------|-----|------|-----------|
|                     | Maximum rating                       |     |      |           |
|                     | Type                                 |     |      |           |
| A                   | aM                                   | gG  | BS88 |           |
| 0.11...0.16         | A                                    | A   | A    | LR2K0301  |
| 0.16...0.23         | 0.25                                 | 0.5 | –    | LR2K0302  |
| 0.23...0.36         | 0.5                                  | 1   | –    | LR2K0303  |
| 0.36...0.54         | 1                                    | 1.6 | –    | LR2K0304  |
| 0.54...0.8          | 1                                    | 2   | –    | LR2K0305  |
| 0.8...1.2           | 2                                    | 4   | 6    | LR2K0306  |
| 1.2...1.8           | 2                                    | 6   | 6    | LR2K0307  |
| 1.8...2.6           | 4                                    | 8   | 10   | LR2K0308  |
| 2.6...3.7           | 4                                    | 10  | 16   | LR2K0310  |
| 3.7...5.5           | 6                                    | 16  | 16   | LR2K0312  |
| 5.5...8             | 8                                    | 20  | 20   | LR2K0314  |
| 8...11.5            | 10                                   | 25  | 20   | LR2K0316  |
| 10...14             | 16                                   | 32  | 25   | LR2K0321  |
| 12...16             | 20                                   | 40  | 32   | LR2K0322  |

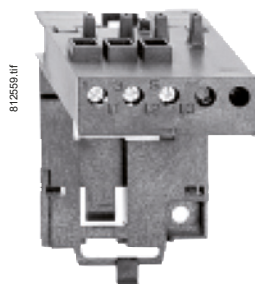
Overload relays for unbalanced loads

**Class 10 A:** to order, replace the prefix **LR2** by **LR7** in the references selected from above (only applicable to overload relays **LR2K0305** to **LR2K0322**).

Example: **LR7K0308**.

### Overload relays

Thermal overload relays for TeSys K contactors -  
adjustable from 0.11 to 16 A Class 10 A



LA7K0064

| Accessory                                                                        |                    |           |
|----------------------------------------------------------------------------------|--------------------|-----------|
| Description                                                                      | Type of connection | Reference |
| Terminal block for separate clip-on mounting of the overload relay on 35 mm rail | Screw clamp        | LA7K0064  |

## Overload relays

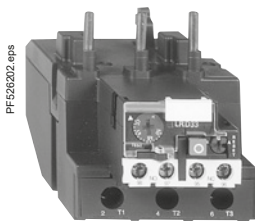
Thermal overload relays for TeSys D contactors - Class 10 A



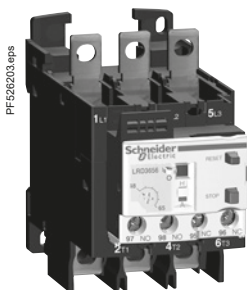
LRD01



LRD30



LRD300



LRD3006

### 3-pole differential thermal overload relays for screw clamp connectors and lugs for use with fuses or magnetic circuit breakers GV2L and GV3L

- Compensated relays with manual or automatic reset
- with relay trip indicator
- for a.c. or d.c.

| Relay setting range (A)                                                                          | Fuses to be used with selected relay |        |          | For use with contactor LC1 | Reference                    | Weight kg |
|--------------------------------------------------------------------------------------------------|--------------------------------------|--------|----------|----------------------------|------------------------------|-----------|
|                                                                                                  | aM (A)                               | gG (A) | BS88 (A) |                            |                              |           |
| <b>Class 10 A <sup>(1)</sup> for connection by screw clamp terminals or connectors</b>           |                                      |        |          |                            |                              |           |
| 0.10...0.16                                                                                      | 0.25                                 | 2      | —        | D09...D38                  | <b>LRD01</b>                 | 0.124     |
| 0.16...0.25                                                                                      | 0.5                                  | 2      | —        | D09...D38                  | <b>LRD02</b>                 | 0.124     |
| 0.25...0.40                                                                                      | 1                                    | 2      | —        | D09...D38                  | <b>LRD03</b>                 | 0.124     |
| 0.40...0.63                                                                                      | 1                                    | 2      | —        | D09...D38                  | <b>LRD04</b>                 | 0.124     |
| 0.63...1                                                                                         | 2                                    | 4      | —        | D09...D38                  | <b>LRD05</b>                 | 0.124     |
| 1...1.6                                                                                          | 2                                    | 4      | 6        | D09...D38                  | <b>LRD06</b>                 | 0.124     |
| 1.6...2.5                                                                                        | 4                                    | 6      | 10       | D09...D38                  | <b>LRD07</b>                 | 0.124     |
| 2.5...4                                                                                          | 6                                    | 10     | 16       | D09...D38                  | <b>LRD08</b>                 | 0.124     |
| 4...6                                                                                            | 8                                    | 16     | 16       | D09...D38                  | <b>LRD10</b>                 | 0.124     |
| 5.5...8                                                                                          | 12                                   | 20     | 20       | D09...D38                  | <b>LRD12</b>                 | 0.124     |
| 7...10                                                                                           | 12                                   | 20     | 20       | D09...D38                  | <b>LRD14</b>                 | 0.124     |
| 9...13                                                                                           | 16                                   | 25     | 25       | D12...D38                  | <b>LRD16</b>                 | 0.124     |
| 12...18                                                                                          | 20                                   | 35     | 32       | D18...D38                  | <b>LRD21</b>                 | 0.124     |
| 16...24                                                                                          | 25                                   | 50     | 50       | D25...D38                  | <b>LRD22</b>                 | 0.124     |
| 23...32                                                                                          | 40                                   | 63     | 63       | D25...D38                  | <b>LRD32</b>                 | 0.124     |
| 30...38                                                                                          | 40                                   | 80     | 80       | D32 and D38                | <b>LRD35</b>                 | 0.124     |
| <b>Class 10 A <sup>(1)</sup> for connection by EverLink® BTR screw connectors <sup>(3)</sup></b> |                                      |        |          |                            |                              |           |
| 9...13                                                                                           | 16                                   | 25     | 25       | D40A...D65A                | <b>LRD313</b>                | 0.375     |
| 12...18                                                                                          | 20                                   | 32     | 35       | D40A...D65A                | <b>LRD318</b>                | 0.375     |
| 17...25                                                                                          | 25                                   | 50     | 50       | D40A...D65A                | <b>LRD325</b>                | 0.375     |
| 23...32                                                                                          | 40                                   | 63     | 63       | D40A...D65A                | <b>LRD332</b>                | 0.375     |
| 30...40                                                                                          | 40                                   | 80     | 80       | D40A...D65A                | <b>LRD340</b>                | 0.375     |
| 37...50                                                                                          | 63                                   | 100    | 100      | D40A...D65A                | <b>LRD350</b>                | 0.375     |
| 48...65                                                                                          | 63                                   | 100    | 100      | D50A and D65A              | <b>LRD365</b>                | 0.375     |
| 62...80                                                                                          | 80                                   | 125    | 125      | D80A                       | <b>LRD380 <sup>(4)</sup></b> | 0.375     |
| <b>Class 10 A <sup>(1)</sup> for connection by screw clamp terminals or connectors</b>           |                                      |        |          |                            |                              |           |
| 17...25                                                                                          | 25                                   | 50     | 50       | D80 and D95                | <b>LRD3322</b>               | 0.510     |
| 23...32                                                                                          | 40                                   | 63     | 63       | D80 and D95                | <b>LRD3353</b>               | 0.510     |
| 30...40                                                                                          | 40                                   | 100    | 80       | D80 and D95                | <b>LRD3355</b>               | 0.510     |
| 37...50                                                                                          | 63                                   | 100    | 100      | D80 and D95                | <b>LRD3357</b>               | 0.510     |
| 48...65                                                                                          | 63                                   | 100    | 100      | D80 and D95                | <b>LRD3359</b>               | 0.510     |
| 55...70                                                                                          | 80                                   | 125    | 125      | D80 and D95                | <b>LRD3361</b>               | 0.510     |
| 63...80                                                                                          | 80                                   | 125    | 125      | D80 and D95                | <b>LRD3363</b>               | 0.510     |
| 80...104                                                                                         | 100                                  | 160    | 160      | D80 and D95                | <b>LRD3365</b>               | 0.510     |
| 80...104                                                                                         | 125                                  | 200    | 160      | D115 and D150              | <b>LRD4365</b>               | 0.900     |
| 95...120                                                                                         | 125                                  | 200    | 200      | D115 and D150              | <b>LRD4367</b>               | 0.900     |
| 110...140                                                                                        | 160                                  | 250    | 200      | D150                       | <b>LRD4369</b>               | 0.900     |
| 80...104                                                                                         | 100                                  | 160    | 160      | (2)                        | <b>LRD33656</b>              | 1.000     |
| 95...120                                                                                         | 125                                  | 200    | 200      | (2)                        | <b>LRD33676</b>              | 1.000     |
| 110...140                                                                                        | 160                                  | 250    | 200      | (2)                        | <b>LRD33696</b>              | 1.000     |

### Class 10 A <sup>(1)</sup> for connection by lugs

Select the appropriate overload relay with screw clamp terminals or connectors from the table above and add one of the following suffixes:

- figure 6 for relays LRD01 to LRD35 and relays LRD313 to LRD380 <sup>(4)</sup>.
- A66 for relays LRD3322 to LRD3363.

Relays LRD4300 are suitable, as standard, for use with lug-clamps.

### Thermal overload relays for use with unbalanced loads

#### Class 10 A <sup>(1)</sup> for connection by screw clamp terminals or lugs

In the references selected above, change the prefix LRD (except LRD4300) to LR3D.

Example: **LRD01** becomes **LR3D01**.

Example with EverLink® connectors: **LRD340** becomes **LR3D340**.

Example with lugs: **LRD3406** becomes **LR3D3406**.

(1) Standard IEC 60947-4-1 specifies a tripping time for 7.2 times the setting current  $I_{R^*}$ : class 10 A: between 2 and 10 seconds.

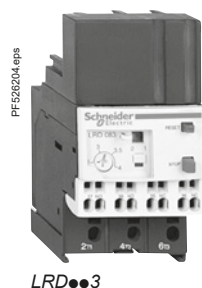
(2) Independent mounting of the contactor.

(3) BTR screws: hexagon socket head. In accordance with local electrical wiring regulations, a size 4 insulated Allen key must be used (reference LADALLEN4, see page B8/29).

(4) LRD380 available end 2017.

## Overload relays

Thermal overload relays for TeSys D contactors - Class 10 A



### 3-pole differential thermal overload relays for spring terminals for use with fuses or magnetic circuit breakers GV2L and GV3L

- Compensated relays with manual or automatic reset
- with relay trip indicator
- for a.c. or d.c.

| Relay setting range (A)                                                                                                | Fuses to be used with selected relay |        |          | For use with contactor LC1 | Reference     |
|------------------------------------------------------------------------------------------------------------------------|--------------------------------------|--------|----------|----------------------------|---------------|
|                                                                                                                        | aM (A)                               | gG (A) | BS88 (A) |                            |               |
| <b>Classes 10 A <sup>(1)</sup> for connection by spring terminals (only for direct mounting beneath the contactor)</b> |                                      |        |          |                            |               |
| 0.10...0.16                                                                                                            | 0.25                                 | 2      | –        | D09...D38                  | <b>LRD013</b> |
| 0.16...0.25                                                                                                            | 0.5                                  | 2      | –        | D09...D38                  | <b>LRD023</b> |
| 0.25...0.40                                                                                                            | 1                                    | 2      | –        | D09...D38                  | <b>LRD033</b> |
| 0.40...0.63                                                                                                            | 1                                    | 2      | –        | D09...D38                  | <b>LRD043</b> |
| 0.63...1                                                                                                               | 2                                    | 4      | –        | D09...D38                  | <b>LRD053</b> |
| 1...1.6                                                                                                                | 2                                    | 4      | 6        | D09...D38                  | <b>LRD063</b> |
| 1.6...2.5                                                                                                              | 4                                    | 6      | 10       | D09...D38                  | <b>LRD073</b> |
| 2.5...4                                                                                                                | 6                                    | 10     | 16       | D09...D38                  | <b>LRD083</b> |
| 4...6                                                                                                                  | 8                                    | 16     | 16       | D09...D38                  | <b>LRD103</b> |
| 5.5...8                                                                                                                | 12                                   | 20     | 20       | D09...D38                  | <b>LRD123</b> |
| 7...10                                                                                                                 | 12                                   | 20     | 20       | D09...D38                  | <b>LRD143</b> |
| 9...13                                                                                                                 | 16                                   | 25     | 25       | D12...D38                  | <b>LRD163</b> |
| 12...18                                                                                                                | 20                                   | 35     | 32       | D18...D38                  | <b>LRD213</b> |
| 16...24                                                                                                                | 25                                   | 50     | 50       | D25...D38                  | <b>LRD223</b> |

### Class 10 A with connection by EverLink® BTR screw connectors <sup>(2)</sup> and control by spring terminals

|         |    |     |     |               |                               |
|---------|----|-----|-----|---------------|-------------------------------|
| 9...13  | 16 | 25  | 25  | D40A...D65A   | <b>LRD3133</b>                |
| 12...18 | 20 | 32  | 35  | D40A...D65A   | <b>LRD3183</b>                |
| 17...25 | 25 | 50  | 50  | D40A...D65A   | <b>LRD3253</b>                |
| 23...32 | 40 | 63  | 63  | D40A...D65A   | <b>LRD3323</b>                |
| 30...40 | 40 | 80  | 80  | D40A...D65A   | <b>LRD3403</b>                |
| 37...50 | 63 | 100 | 100 | D40A...D65A   | <b>LRD3503</b>                |
| 48...65 | 63 | 100 | 100 | D50A and D65A | <b>LRD3653</b>                |
| 62...80 | 80 | 125 | 125 | D80A          | <b>LRD3803 <sup>(3)</sup></b> |

### Thermal overload relays for use with unbalanced loads

#### Classes 10 A <sup>(1)</sup> for connection by BTR screw connectors <sup>(2)</sup> and control by spring terminals

In the references selected above, replace **LRD3** with **LR3D3**.

Example: **LRD3653** becomes **LR3D3653**.

### Thermal overload relays for use on 1000 V supplies

#### Classes 10 A <sup>(1)</sup> for connection by screw clamp terminals

For relays LRD06 to LRD35 only, for an operating voltage of 1000 V, and only for independent mounting, the reference becomes **LRD33...A66**.

Order an **LA7D3064** terminal block separately, see page B11/9.

| Standard relay | Relay for 1000 V network |
|----------------|--------------------------|
| LRD06          | LRD3306A66               |
| LRD07          | LRD3307A66               |
| LRD08          | LRD3308A66               |
| LRD10          | LRD3310A66               |
| LRD12          | LRD3312A66               |
| LRD14          | LRD3314A66               |
| LRD16          | LRD3316A66               |
| LRD21          | LRD3321A66               |
| LRD22          | LRD3322A66               |
| LRD32          | LRD3353A66               |
| LRD35          | LRD3355A66               |

<sup>(1)</sup> Standard IEC 60947-4-1 specifies a tripping time for 7.2 times the setting current  $I_n$ : class 10 A: between 2 and 10 seconds.

<sup>(2)</sup> BTR screws: hexagon socket head. In accordance with local electrical wiring regulations, a size 4 insulated Allen key must be used (reference **LADALLEN4**, see page B8/29).

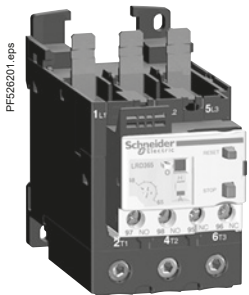
<sup>(3)</sup> **LRD3803** available end 2017.

## Overload relays

Thermal overload relay for TeSys D contactors - Class 20



LRD04L...LRD32L



LRD300L



LR2D3500

### 3-pole differential thermal overload relays for screw clamp connectors and lugs for use with fuses or magnetic circuit breakers GV2L and GV3L

- Compensated relays with manual or automatic reset
- with relay trip indicator
- for a.c. or d.c.

| Relay setting range (A)                                                                        | Fuses to be used with selected relay |        |          | For use with contactor LC1 | Reference       |
|------------------------------------------------------------------------------------------------|--------------------------------------|--------|----------|----------------------------|-----------------|
|                                                                                                | aM (A)                               | gG (A) | BS88 (A) |                            |                 |
| <b>Classes 20 <sup>(1)</sup> for connection by screw clamp terminals</b>                       |                                      |        |          |                            |                 |
| 0.4...0.63                                                                                     | 1                                    | 2      | -        | D09...D38                  | <b>LRD04L</b>   |
| 0.63...1                                                                                       | 2                                    | 4      | -        | D09...D38                  | <b>LRD05L</b>   |
| 1...1.6                                                                                        | 2                                    | 4      | 6        | D09...D38                  | <b>LRD06L</b>   |
| 1.6...2.5                                                                                      | 4                                    | 6      | 10       | D09...D38                  | <b>LRD07L</b>   |
| 2.5...4                                                                                        | 6                                    | 10     | 16       | D09...D38                  | <b>LRD08L</b>   |
| 4...6                                                                                          | 8                                    | 16     | 16       | D09...D38                  | <b>LRD10L</b>   |
| 5.5...8                                                                                        | 12                                   | 20     | 20       | D09...D38                  | <b>LRD12L</b>   |
| 7...10                                                                                         | 12                                   | 20     | 20       | D09...D38                  | <b>LRD14L</b>   |
| 9...13                                                                                         | 16                                   | 25     | 25       | D12...D38                  | <b>LRD16L</b>   |
| 12...18                                                                                        | 20                                   | 35     | 32       | D18...D38                  | <b>LRD21L</b>   |
| 17...24                                                                                        | 25                                   | 50     | 50       | D25...D38                  | <b>LRD22L</b>   |
| 23...32                                                                                        | 40                                   | 63     | 63       | D25...D38                  | <b>LRD32L</b>   |
| <b>Class 20 <sup>(1)</sup> for connection by EverLink® BTR screw connectors <sup>(2)</sup></b> |                                      |        |          |                            |                 |
| 9...13                                                                                         | 20                                   | 32     | 35       | D40A...D65A                | <b>LRD313L</b>  |
| 12...18                                                                                        | 25                                   | 40     | 40       | D40A...D65A                | <b>LRD318L</b>  |
| 17...25                                                                                        | 32                                   | 50     | 50       | D40A...D65A                | <b>LRD325L</b>  |
| 23...32                                                                                        | 40                                   | 63     | 63       | D40A...D65A                | <b>LRD332L</b>  |
| 30...40                                                                                        | 50                                   | 80     | 80       | D40A...D65A                | <b>LRD340L</b>  |
| 37...50                                                                                        | 63                                   | 100    | 100      | D40A...D65A                | <b>LRD350L</b>  |
| 48...65                                                                                        | 80                                   | 125    | 125      | D50A and D65A              | <b>LRD365L</b>  |
| <b>Classes 20 <sup>(1)</sup> for connection by screw clamp terminals</b>                       |                                      |        |          |                            |                 |
| 17...25                                                                                        | 32                                   | 50     | 50       | D80 and D95                | <b>LR2D3522</b> |
| 23...32                                                                                        | 40                                   | 63     | 63       | D80 and D95                | <b>LR2D3553</b> |
| 30...40                                                                                        | 40                                   | 100    | 80       | D80 and D95                | <b>LR2D3555</b> |
| 37...50                                                                                        | 63                                   | 100    | 100      | D80 and D95                | <b>LR2D3557</b> |
| 48...65                                                                                        | 80                                   | 125    | 100      | D80 and D95                | <b>LR2D3559</b> |
| 55...70                                                                                        | 100                                  | 125    | 125      | D80 and D95                | <b>LR2D3561</b> |
| 63...80                                                                                        | 100                                  | 160    | 125      | D80 and D95                | <b>LR2D3563</b> |

#### Class 20 <sup>(1)</sup> for connection by lugs

For relays LRD04L to LRD32L and relays LRD313L to LRD365L, select the appropriate overload relay with screw clamp terminals or connectors from the table above and add the suffix **6**.

Example: **LRD04L** becomes **LRD04L6**.

### Thermal overload relays for use with unbalanced loads

#### Class 20 <sup>(1)</sup> for connection by screw clamp terminals or lugs

For relays LRD04L to LRD32L and relays LR2D3522 to LR2D3563, select the appropriate overload relay with screw clamp terminals or connectors from the table above and change the prefix LRD or LR2D to **LR3D**.

Example: **LRD04L** becomes **LR3D04L**.

<sup>(1)</sup> Standard IEC 60947-4-1 specifies a tripping time for 7.2 times the setting current  $I_R$ :  
class 20: between 6 and 20 seconds

<sup>(2)</sup> BTR screws: hexagon socket head. In accordance with local electrical wiring regulations, a size 4 insulated Allen key must be used (reference **LADALLEN4**, see page B8/29).

## Overload relays

## Thermal overload relay for TeSys D contactors - Class 20

**3-pole differential thermal overload relays for screw clamp connectors and springs for use with fuses or magnetic circuit breakers GV2L and GV3L**

- Compensated relays with manual or automatic reset
- with relay trip indicator
- for a.c. or d.c.

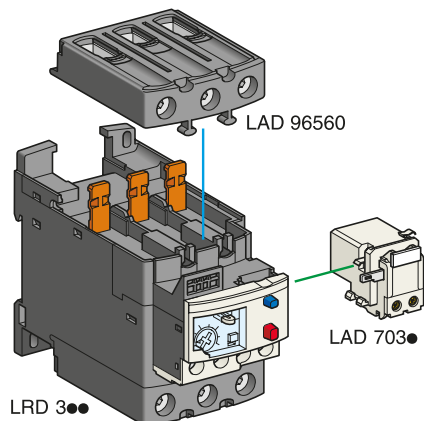
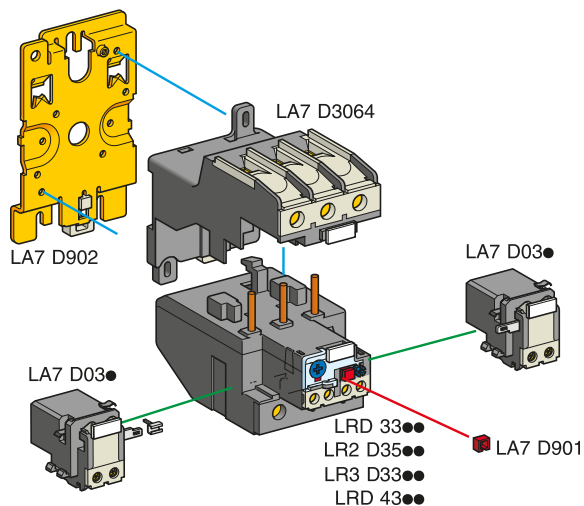
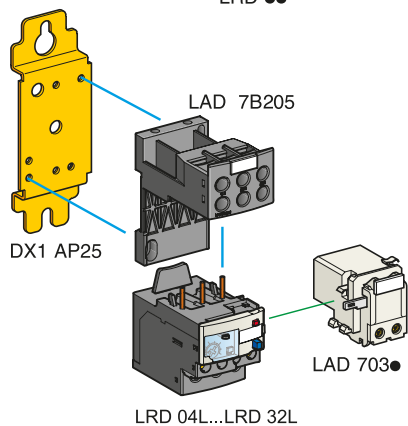
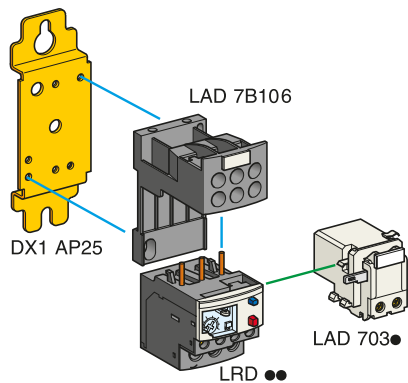
| Relay setting<br>range (A)                                                                                               | Fuses to be used with selected relay |        |          | For mounting<br>beneath contactor<br>LC1 | Reference |
|--------------------------------------------------------------------------------------------------------------------------|--------------------------------------|--------|----------|------------------------------------------|-----------|
|                                                                                                                          | aM (A)                               | gG (A) | BS88 (A) |                                          |           |
| Class 20 <sup>(1)</sup> with connection by EverLink® BTR screw connectors <sup>(2)</sup> and control by spring terminals |                                      |        |          |                                          |           |
| 9...13                                                                                                                   | 20                                   | 32     | 35       | D40A...D65A                              | LRD313L3  |
| 12...18                                                                                                                  | 25                                   | 40     | 40       | D40A...D65A                              | LRD318L3  |
| 17...25                                                                                                                  | 32                                   | 50     | 50       | D40A...D65A                              | LRD325L3  |
| 23...32                                                                                                                  | 40                                   | 63     | 63       | D40A...D65A                              | LRD332L3  |
| 30...40                                                                                                                  | 50                                   | 80     | 80       | D40A...D65A                              | LRD340L3  |
| 37...50                                                                                                                  | 63                                   | 100    | 100      | D40A...D65A                              | LRD350L3  |
| 48...65                                                                                                                  | 80                                   | 125    | 125      | D50A and D65A                            | LRD365L3  |

<sup>(1)</sup> Standard IEC 60947-4-1 specifies a tripping time for 7.2 times the setting current  $I_R$ :

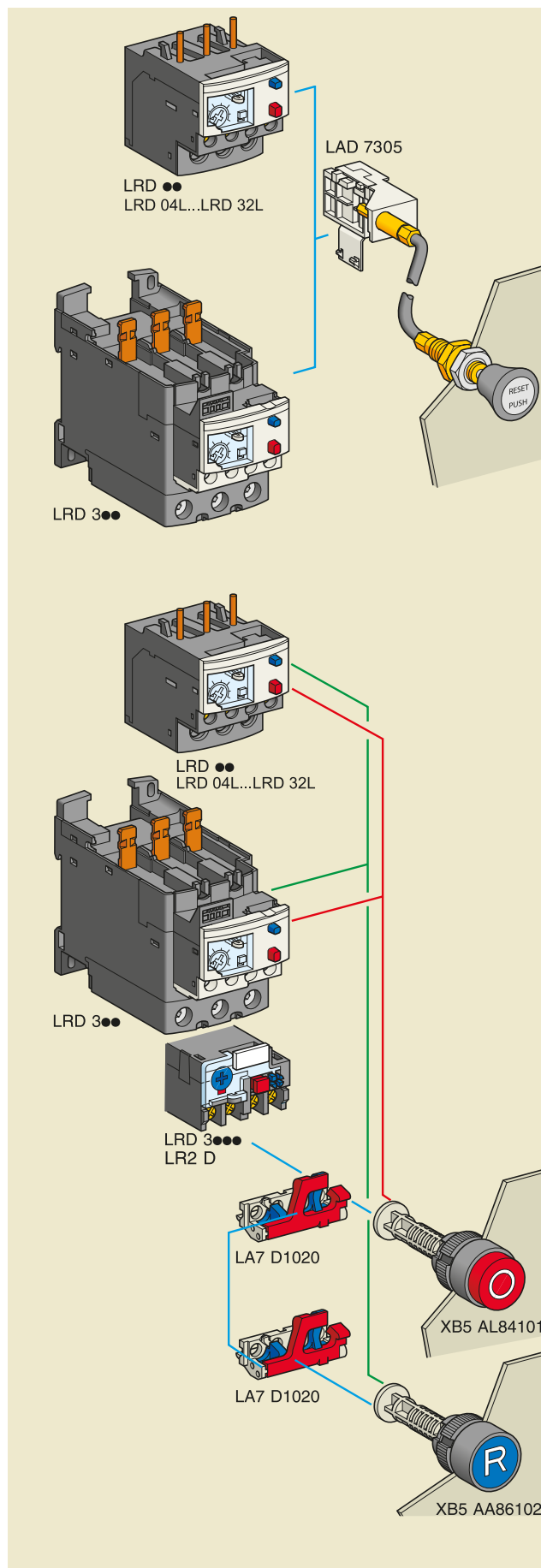
class 10: between 4 and 10 seconds,  
class 10 A: between 2 and 10 seconds,  
class 20: between 6 and 20 seconds.

<sup>(2)</sup> BTR screws: hexagon socket head. In accordance with local electrical wiring regulations, a size 4 insulated Allen key must be used (reference **LADALLEN4**, see page B8/29).





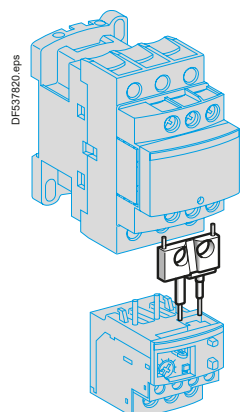
Overload  
relays



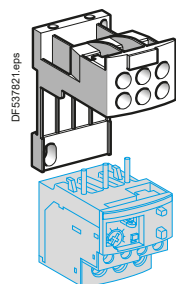


## Overload relays

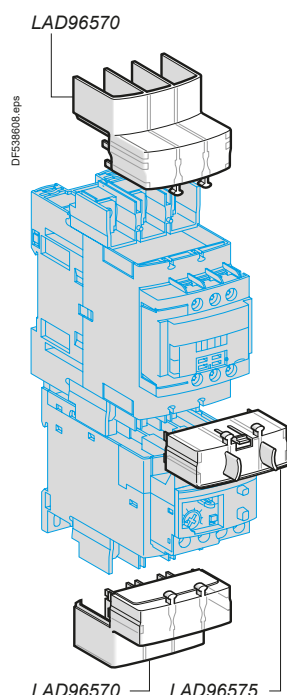
Thermal overload relays for TeSys D contactors - Accessories



LAD7C●



LAD7B106



LAD96570 — LAD96575

## Separate components for relays

| Description                                                                                                                                 | For use with                                                                                                                      | Sold in lots of | Unit reference                                  |
|---------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|-----------------|-------------------------------------------------|
| Pre-wiring kit allowing direct connection of the N/C contact of relay LRD01...35 or LR3D01...D35 to the contactor                           | LC1D09...D18<br>LC1D25...D38                                                                                                      | 10<br>10        | LAD7C1 <sup>(1)</sup><br>LAD7C2 <sup>(1)</sup>  |
| Terminal block <sup>(2)</sup> for clip-on mounting on 35 mm rail (AM1DP200) or screw fixing; for fixing centres, see pages B11/35 to B11/37 | LRD01...35 and LR3D01...D35<br>LRD04L...LRD32L, LR3D04L...LR3D32L<br>LRD43●●, LR3D33●●●, LR3D33●●●, LR2D35●●                      | 1<br>1<br>1     | LAD7B106<br>LAD7B205<br>LA7D3064 <sup>(3)</sup> |
| EverLink® terminal block for independent mounting                                                                                           | LRD3●●, LR3D3●●L and LR3D3●●                                                                                                      | 1               | LAD96560                                        |
| Size 4 Allen key, insulated, 1000 V                                                                                                         | LRD3●●, LR3D3●●L and LR3D3●●                                                                                                      | 5               | LADALLEN4                                       |
| Terminal block adapter for mounting a relay beneath an LC1D115 or D150 contactor                                                            | LRD33●●, LR3D33●●, LR3D35●●                                                                                                       | 1               | LA7D3058 <sup>(3)</sup>                         |
| Mounting plates <sup>(4)</sup> for screw fixing on 110 mm centres                                                                           | LRD01...35, LR3D01...D35, LRD04L...LRD32L, LR3D04L...LR3D32L<br>LRD3●●●, LR3D3●●●, LR2D35●●                                       | 10<br>1         | DX1AP25<br>LA7D902                              |
| Marker holders, snap-in 8 x 18 mm                                                                                                           | LRD3●●<br>All relays except LRD01...35, LRD04L...32L, LR3D04L...D32L, LR3D01...D35, LR3D3●●, LR3D3●●L and LR3D3●●                 | 100<br>100      | LAD90<br>LA7D903                                |
| Bag of 400 blank legends (self-adhesive, 7 x 16 mm)                                                                                         | All relays                                                                                                                        | 1               | LA9D91                                          |
| Stop button locking device                                                                                                                  | All relays except LRD01...35, LRD04L...32L, LR3D04L...D32L, LR3D01...D35, LR9 D and LR3D313...LRD380 <sup>(9)</sup>               | 10              | LA7D901                                         |
| Remote Stop or electrical reset device <sup>(5)</sup>                                                                                       | LRD01...35, LR3D01...D35, LRD04L...32L, LR3D04L...D32L and LR3D313...LRD380 <sup>(9)</sup>                                        | 1               | LAD703● <sup>(6) (7)</sup>                      |
| Remote tripping or electrical reset device <sup>(5)</sup>                                                                                   | All relays except LRD01...35, LR9D01...32, LRD04L...32L, LR3D04L...D32L, LR3D01...D35, LR9D01...32, LR3D3●●, LR3D3●●L and LR3D3●● | 1               | LA7D03● <sup>(6)</sup>                          |
| Block of insulated terminals                                                                                                                | LR9 D                                                                                                                             | 2               | LA9F103 <sup>(7)</sup>                          |
| IP 20 cover for lug type terminals for independent mounting                                                                                 | LRD3136...3806 <sup>(9)</sup>                                                                                                     | 1               | LAD96570                                        |
| IP 20 cover for lug type terminals for mounting with contactor LC1D40A6...D65A6                                                             | LRD3136...3806 <sup>(9)</sup>                                                                                                     | 1               | LAD96575                                        |
| Terminal block for lug type terminals for independent mounting                                                                              | LRD3136...3806 <sup>(9)</sup>                                                                                                     | 1               | LAD96566                                        |

## Remote control

## "Reset" function

| Description                        | For use with                                                                                            | Sold in lots of | Unit reference         |
|------------------------------------|---------------------------------------------------------------------------------------------------------|-----------------|------------------------|
| By flexible cable (length = 0.5 m) | LRD01...35, LR3D01...D35, LR3D04L...D32L and LR3D313...LRD380 <sup>(9)</sup> , LRD04L...LRD32L          | 1               | LAD7305 <sup>(8)</sup> |
|                                    | All relays except LRD01...35, LR3D01...D35, LR3D3●●, LRD04L...32L, LR3D04L...D32L, LR3D3●●L and LR3D3●● | 1               | LA7D305                |

## "Stop" and/or "Reset" functions

The terminal protection shroud must be removed and the following 3 products must be ordered separately:

|                                                 |               |            |   |            |
|-------------------------------------------------|---------------|------------|---|------------|
| Adapter for door mounting                       | LRD33●●, LR2D |            | 1 | LA7D1020   |
| Operating heads<br>for spring return pushbutton | Stop          | All relays | 1 | XB5AL84101 |
|                                                 | Reset         | All relays | 1 | XB5AA86102 |

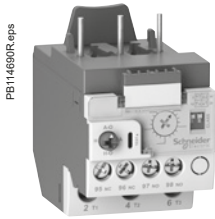
- (1) These pre-wiring kits cannot be used with reversing contactors.  
 (2) Terminal blocks are supplied with terminals protected against direct finger contact and screws in the open, "ready-to-tighten" position.  
 (3) To order a terminal block for connection by lugs, the reference becomes LA7D30646.  
 (4) Remember to order the terminal block corresponding to the type of relay.  
 (5) The time for which the coil of remote tripping or electrical resetting device LA7D03 or LAD703 can remain energised depends on its rest time: 1 s pulse duration with 9 s rest time; 5 s pulse duration with 30 s rest time; 10 s pulse duration with 90 s rest time; maximum pulse duration 20 s with a rest time of 300 s. Minimum pulse time: 200 ms.  
 (6) Reference to be completed by adding the code indicating the control circuit voltage.  
 Standard control circuit voltages (for other voltages, please consult your Regional Sales Office):

| Volts                                    | 12 | 24 | 48 | 96 | 110 | 220/230 | 380/400 | 415/440 |
|------------------------------------------|----|----|----|----|-----|---------|---------|---------|
| 50/60 Hz                                 | —  | B  | E  | —  | F   | M       | Q       | N       |
| Consumption, inrush and sealed: < 100 VA |    |    |    |    |     |         |         |         |
| —                                        | J  | B  | E  | DD | F   | M       | —       | —       |
| Consumption, inrush and sealed: < 100 W. |    |    |    |    |     |         |         |         |

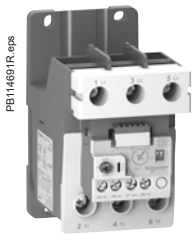
- (7) Only one terminal block can be mounted below LR9D.  
 (8) Not compatible with 3-pole relays fitted with spring terminals.  
 (9) LRD380, LRD3806 available end 2017.

## Overload relays

Electronic thermal overload relays for TeSys D contactors



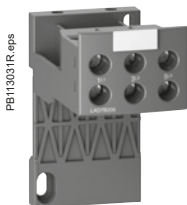
LR9D01 and LR9D32



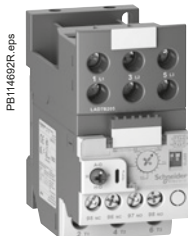
LR9D110S



LR9D5597



LAD7B205

LAD7B205 mounted  
on LR9D01

LR9D67

## Electronic thermal overload relays

For use with fuses or magnetic circuit breakers

- compensated relays, with relay trip indicator,
- for a.c.,
- for direct mounting on contactor or independent mounting <sup>(1)</sup>.

| Relay setting range                                                                                                            | Fuses to be used with selected relay |     | For direct mounting beneath contactor LC1 | Reference |
|--------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|-----|-------------------------------------------|-----------|
|                                                                                                                                | aM                                   | gG  |                                           |           |
| A                                                                                                                              | A                                    | A   |                                           |           |
| <b>Classes 5.10.20.30 <sup>(1)</sup> selectable for direct connection on TeSys D contactors or connection using connectors</b> |                                      |     |                                           |           |
| 0.1...0.5                                                                                                                      |                                      |     | D09...D38                                 | LR9D01    |
| 0.4...2                                                                                                                        |                                      |     | D09...D38                                 | LR9D02    |
| 1.6...8                                                                                                                        |                                      |     | D09...D38                                 | LR9D08    |
| 6.4...32                                                                                                                       |                                      |     | D09...D38                                 | LR9D32    |
| <b>Classes 5.10.20.30 <sup>(1)</sup> selectable for connection using connectors</b>                                            |                                      |     |                                           |           |
| 22...110                                                                                                                       |                                      |     |                                           | LR9D110S  |
| <b>Classes 10 or 10 A <sup>(1)</sup> for connection using bars or connectors</b>                                               |                                      |     |                                           |           |
| 60...100                                                                                                                       | 100                                  | 160 | D115...D150                               | LR9D5367  |
| 90...150                                                                                                                       | 160                                  | 250 | D115...D150                               | LR9D5369  |
| <b>Classes 20 <sup>(1)</sup> for connection using bars or connectors</b>                                                       |                                      |     |                                           |           |
| 60...100                                                                                                                       | 125                                  | 160 | D115...D150                               | LR9D5567  |
| 90...150                                                                                                                       | 200                                  | 250 | D115...D150                               | LR9D5569  |

## Separate components for relays

| Description                                                                                                                                          | For use with                            | Sold in lots of | Unit reference |
|------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|-----------------|----------------|
| Terminal block <sup>(2)</sup><br>For clips-on mounting on 35 mm rails (AM1DP200) or screws fixing;<br>for fixing centres, see pages B11/35 to B11/37 | LR9D01,<br>LR9D02,<br>LR9D08,<br>LR9D32 | 1               | LAD7B205       |

## Electronic overload relays for balanced or unbalanced loads

| Relay setting range                                                                              | Fuses to be used with selected relay |     | For direct mounting beneath contactor LC1 | Reference |
|--------------------------------------------------------------------------------------------------|--------------------------------------|-----|-------------------------------------------|-----------|
|                                                                                                  | aM                                   | gG  |                                           |           |
| A                                                                                                | A                                    | A   |                                           |           |
| <b>Classes 10 or 20 <sup>(1)</sup> selectable for direct connection using bars or connectors</b> |                                      |     |                                           |           |
| 60...100                                                                                         | 100                                  | 160 | D115...D150                               | LR9D67    |
| 90...150                                                                                         | 160                                  | 250 | D115...D150                               | LR9D69    |

<sup>(1)</sup> Standard IEC 60947-4-1 specifies a tripping time for 7.2 times the setting current  $I_{Rt}$ :

- class 5: between 0.5 and 5 seconds
- class 10: between 4 and 10 seconds
- class 10 A: between 2 and 10 seconds
- class 20: between 6 and 20 seconds
- class 30: between 9 and 30 seconds.

<sup>(2)</sup> Terminal blocks are supplied with terminals protected against direct finger contact and screws in the open, "ready-to-tighten" position.

<sup>(3)</sup> Power terminals can be protected against direct finger contact by the addition of shrouds and/or insulated terminal blocks, to be ordered separately (see page B8/20).

## Overload relays

Electronic thermal overload relays for TeSys F contactors



LR9F53●●



LR9F73●●

## Compensated and differential overload relays

Thermal overload relays:

- compensated and differential,
- with relay trip indicator,
- for a.c.,
- for direct mounting on contactor or independent mounting <sup>(1)</sup>.

| Relay<br>setting range         | Fuses to be used<br>with selected relay |     | For direct mounting<br>beneath contactor<br>LC1 | Reference | Weight |
|--------------------------------|-----------------------------------------|-----|-------------------------------------------------|-----------|--------|
|                                | aM                                      | gG  |                                                 |           |        |
| A                              | A                                       | A   |                                                 |           | kg     |
| <b>Class 10 <sup>(2)</sup></b> |                                         |     |                                                 |           |        |
| 30...50                        | 50                                      | 80  | F115...F185                                     | LR9F5357  | 0.885  |
| 48...80                        | 80                                      | 125 | F115...F185                                     | LR9F5363  | 0.900  |
| 60...100                       | 100                                     | 200 | F115...F185                                     | LR9F5367  | 0.900  |
| 90...150                       | 160                                     | 250 | F115...F185                                     | LR9F5369  | 0.885  |
| 132...220                      | 250                                     | 315 | F185...F265                                     | LR9F5371  | 0.950  |
| 200...330                      | 400                                     | 500 | F225...F500                                     | LR9F7375  | 2.320  |
| 300...500                      | 500                                     | 800 | F225...F500                                     | LR9F7379  | 2.320  |
| 380...630                      | 630                                     | 800 | F400...F630 and<br>F800                         | LR9F7381  | 4.160  |
| <b>Class 20 <sup>(2)</sup></b> |                                         |     |                                                 |           |        |
| 30...50                        | 50                                      | 80  | F115...F185                                     | LR9F5557  | 0.885  |
| 48...80                        | 80                                      | 125 | F115...F185                                     | LR9F5563  | 0.900  |
| 60...100                       | 100                                     | 200 | F115...F185                                     | LR9F5567  | 0.900  |
| 90...150                       | 160                                     | 250 | F115...F185                                     | LR9F5569  | 0.885  |
| 132...220                      | 250                                     | 315 | F185...F265                                     | LR9F5571  | 0.950  |
| 200...330                      | 400                                     | 500 | F225...F500                                     | LR9F7575  | 2.320  |
| 300...500                      | 500                                     | 800 | F225...F500                                     | LR9F7579  | 2.320  |
| 380...630                      | 630                                     | 800 | F400...F630 and<br>F800                         | LR9F7581  | 4.160  |

<sup>(1)</sup> When mounting overload relays **LR9F5●57...LR9F5●71** directly beneath the contactor, supporting the relays with a mounting plate is recommended (see page B11/14).  
With overload relays **LR9F7●75...LR9F7●81**, use of a support mounting plate is mandatory (see page B11/14).

Power terminals can be protected against direct finger contact by the addition of shrouds and/or insulated terminal blocks, to be ordered separately (see page B11/14).

Interconnection kit **LA7F407** is required for mounting an **LR9F5●71** thermal overload relay together with an **LC1F185** contactor.

<sup>(2)</sup> Standard IEC 60947-4 specifies a tripping time for 7.2 times the setting current  $I_n$ :  
- class 10: between 4 and 10 seconds,  
- class 20: between 6 and 20 seconds.

Overload relays

Electronic thermal overload relays for TeSys F contactors



Compensated overload relays, class 10 or 20 with alarm

- Thermal overload relays:
- compensated,
  - with relay trip indicator,
  - for a.c.,
  - for direct mounting on contactor or independent mounting <sup>(1)</sup>,
  - class 10 or 20 by selector switch,
  - protection of 3-phase or single-phase circuits by selector switch,
  - with alarm function that enables tripping to be forestalled.

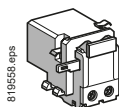
| Relay<br>setting range | Fuses to be used<br>with selected relay |     | For direct mounting<br>beneath contactor<br>LC1 | Reference | Weight |
|------------------------|-----------------------------------------|-----|-------------------------------------------------|-----------|--------|
|                        | aM                                      | gG  |                                                 |           |        |
| A                      | A                                       | A   |                                                 |           | kg     |
| 30...50                | 50                                      | 80  | F115...F185                                     | LR9F57    | 0.885  |
| 48...80                | 80                                      | 125 | F115...F185                                     | LR9F63    | 0.900  |
| 60...100               | 100                                     | 200 | F115...F185                                     | LR9F67    | 0.900  |
| 90...150               | 160                                     | 250 | F115...F185                                     | LR9F69    | 0.885  |
| 132...220              | 250                                     | 315 | F185...F265                                     | LR9F71    | 0.950  |
| 200...330              | 400                                     | 500 | F225...F500                                     | LR9F75    | 2.320  |
| 300...500              | 500                                     | 800 | F225...F500                                     | LR9F79    | 2.320  |
| 380...630              | 630                                     | 800 | F400...F630 and<br>F800                         | LR9F81    | 4.160  |

<sup>(1)</sup> When mounting overload relays **LR9F57...LR9F71** directly beneath the contactor, supporting the relays with a mounting plate is recommended (see page B11/14).  
With overload relays **LR9F75...LR9F81**, use of a support mounting plate is mandatory (see page B11/14).  
Power terminals can be protected against direct finger contact by the addition of shrouds and/or insulated terminal blocks, to be ordered separately (see page B11/14).  
Interconnection kit **LA7F407** is required for mounting an **LR9F71** thermal overload relay together with an **LC1F185** contactor.

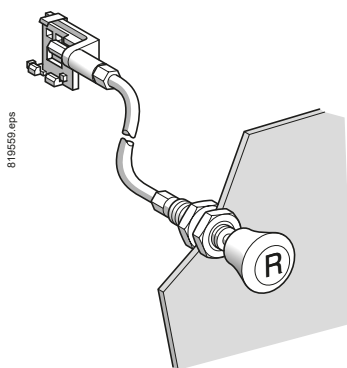
## Overload relays

Electronic thermal overload relays for TeSys F contactors

Accessories (to be ordered separately)



LA7D03●



LA7D305

## Control accessories

| Description                                                      | Sold in lots of                                                     | Unit reference           |
|------------------------------------------------------------------|---------------------------------------------------------------------|--------------------------|
| Remote electrical reset device <sup>(1)</sup>                    | 1                                                                   | LA7D03● <sup>(2)</sup>   |
| Remote Reset function control by flexible cable (length = 0.5 m) | 1                                                                   | LA7D305                  |
| Remote Stop and/or Reset function control                        | Adapter for door mounted operator                                   | 1 LA7D1020               |
|                                                                  | Rod (snap-off end to obtain required length, between 17 and 120 mm) | 10 ZA2BZ13               |
|                                                                  | Operating head for spring return pushbutton                         | 1 ZA2B●●● <sup>(3)</sup> |

## Connection accessories

For mounting an LR9F5●71 thermal overload relay together with an LC1 F185 contactor

| Description      | Reference |
|------------------|-----------|
| Set of 3 busbars | LA7F407   |

For mounting a thermal overload relay beneath a reversing contactor or star-delta contactors

| Application                                          | Width of terminal lug | Set of 3 busbars Reference |
|------------------------------------------------------|-----------------------|----------------------------|
| For relay                                            | For contactor         |                            |
|                                                      | mm                    |                            |
| LR9F5●57, F5●63, F5●67, F5●69, LR9F57, F63, F67, F69 | LC1 F115              | 15 LA7F401                 |
| LR9F5●57, F5●63, F5●67, F5●69, LR9F57, F63, F67, F69 | LC1 F150, F185        | 20 LA7F402                 |
| LR9F5●71, LR9F71                                     | LC1 F185              | 25 LA7F407                 |
| LR9F5●71, LR9F71                                     | LC1 F225, F265        | 25 LA7F403                 |
| LR9F7●75, F7●79, LR9F75, F79                         | LC1 F225...F400       | 25 LA7F404                 |
| LR9F7●81, LR9F81                                     | LC1 F400              | 25 LA7F404                 |
| LR9F7●75, F7●79, F7●81, LR9F75, F79, F81             | LC1 F500              | 30 LA7F405                 |
| LR9F7●81, LR9F81                                     | LC1 F630, F800        | 40 LA7F406                 |

(1) The time for which the coil of remote electrical reset device **LA7D03** can remain energised depends on its rest time: 1 s pulse duration with 9 s rest time; 5 s pulse duration with 30 s rest time; 10 s pulse duration with 90 s rest time. Maximum pulse duration of 20 s with rest time of 300 s. Minimum pulse time: 200 ms.

(2) Reference to be completed by adding the coil voltage code.  
Standard control circuit voltages,  
(for other voltages, please consult your Regional Sales Office):

| Volts                                    | 12 | 24 | 48 | 96 | 110 | 220/<br>230 | 380/<br>400 | 415/<br>440 |
|------------------------------------------|----|----|----|----|-----|-------------|-------------|-------------|
| ~ 50/60 Hz                               | —  | B  | E  | —  | F   | M           | Q           | N           |
| Consumption, inrush and sealed: < 100 VA |    |    |    |    |     |             |             |             |
| ---                                      | J  | B  | E  | DD | F   | M           | —           | —           |

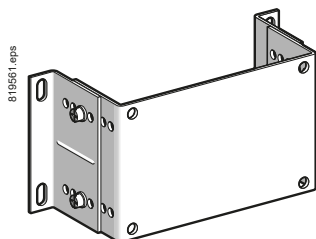
Consumption, inrush and sealed: &lt; 100 W.

(3) Stop: **ZA2BL432** and Reset: **ZA2BL639**.

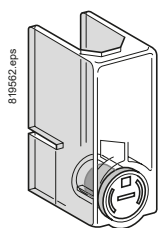
## Overload relays

Electronic thermal overload relays for TeSys F contactors

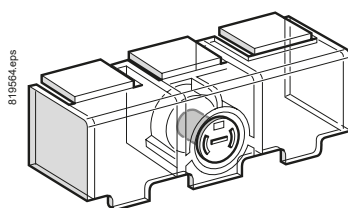
Accessories (to be ordered separately)



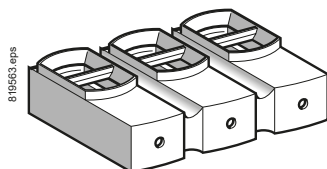
LA7F90●



LA9F70●



LA7F70●



LA9F103

### Mounting plates for overload relay

| For use with relays | Reference |
|---------------------|-----------|
|---------------------|-----------|

|                                                                  |         |
|------------------------------------------------------------------|---------|
| LR9F5●57, F5●63, F5●67, F5●69, F5●71, LR9F57, F63, F67, F69, F71 | LA7F901 |
|------------------------------------------------------------------|---------|

|                                          |         |
|------------------------------------------|---------|
| LR9F7●75, F7●79, F7●81, LR9F75, F79, F81 | LA7F902 |
|------------------------------------------|---------|

### Sets of power terminal protection shrouds, single-pole

| For use with relays | Number of shrouds per set | Set reference |
|---------------------|---------------------------|---------------|
|---------------------|---------------------------|---------------|

|                  |   |         |
|------------------|---|---------|
| LR9F5●57, LR9F57 | 6 | LA9F701 |
|------------------|---|---------|

|                                          |   |         |
|------------------------------------------|---|---------|
| LR9F5●63, F5●67, F5●69, LR9F63, F67, F69 | 6 | LA9F702 |
|------------------------------------------|---|---------|

|                  |   |         |
|------------------|---|---------|
| LR9F5●71, LR9F71 | 6 | LA9F705 |
|------------------|---|---------|

|                                          |   |         |
|------------------------------------------|---|---------|
| LR9F7●75, F7●79, F7●81, LR9F75, F79, F81 | 6 | LA9F703 |
|------------------------------------------|---|---------|

### Power terminal protection shrouds, 3-pole

| For use with relays | Reference |
|---------------------|-----------|
|---------------------|-----------|

|                                                      |         |
|------------------------------------------------------|---------|
| LR9F5●57, F5●63, F5●67, F5●69, LR9F57, F63, F67, F69 | LA7F701 |
|------------------------------------------------------|---------|

|                  |         |
|------------------|---------|
| LR9F5●71, LR9F71 | LA7F702 |
|------------------|---------|

|                                          |         |
|------------------------------------------|---------|
| LR9F7●75, F7●79, F7●81, LR9F75, F79, F81 | LA7F703 |
|------------------------------------------|---------|

### Insulated terminal blocks

| For use with relays | Set of 2 blocks Reference |
|---------------------|---------------------------|
|---------------------|---------------------------|

|                                                      |         |
|------------------------------------------------------|---------|
| LR9F5●57, F5●63, F5●67, F5●69, LR9F57, F63, F67, F69 | LA9F103 |
|------------------------------------------------------|---------|

### Marking accessories

| Description | Sold in lots of | Unit reference |
|-------------|-----------------|----------------|
|-------------|-----------------|----------------|

|                       |     |         |
|-----------------------|-----|---------|
| Clip-in marker holder | 100 | LA7D903 |
|-----------------------|-----|---------|

|                                                  |   |        |
|--------------------------------------------------|---|--------|
| Bag of 400 blank self-adhesive legends 7 x 16 mm | 1 | LA9D91 |
|--------------------------------------------------|---|--------|

## Overload relays

Single-pole magnetic over current relays



RM1XA001

## Non-latching

## With 1 C/O contact block, non-latching

| Recommended operating range (motor In) | Setting range (trip current) | Maximum continuous current ~ or ≡ | Reference |
|----------------------------------------|------------------------------|-----------------------------------|-----------|
| A                                      | A                            | A                                 |           |
| ~ or ≡ 0.7...1.15                      | 1.25...4                     | 1.6                               | RM1XA001  |
| 1.16...1.8                             | 2...6.3                      | 2.5                               | RM1XA002  |
| 1.9...2.9                              | 3.2...10                     | 4                                 | RM1XA004  |
| 3...4.6                                | 5...16                       | 6.3                               | RM1XA006  |
| 4.7...7.2                              | 8...25                       | 10                                | RM1XA010  |
| 7.3...11.5                             | 12.5...40                    | 16                                | RM1XA016  |
| 11.6...18                              | 20...63                      | 25                                | RM1XA025  |
| 18.1...29                              | 32...100                     | 40                                | RM1XA040  |
| 29.1...46                              | 50...160                     | 63                                | RM1XA063  |
| 46.1...72                              | 80...250                     | 100                               | RM1XA100  |
| 73...115                               | 125...400                    | 160                               | RM1XA160  |
| 116...145                              | 160...500                    | 200                               | RM1XA200  |
| 146...230                              | 250...800                    | 315                               | RM1XA315  |
| 231...360                              | 400...1250                   | 500                               | RM1XA500  |
| ~ 361...630                            | 630...2200                   | 1000                              | RM1XA101  |
| ≡ 361...570                            | 630...2000                   | 1000                              | RM1XA101  |

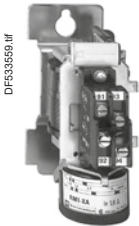
## Accessory (to be ordered separately)

| Description                       | Reference |
|-----------------------------------|-----------|
| 1 C/O contact block, non-latching | RM1ZG21   |

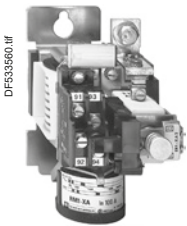


Overload relays

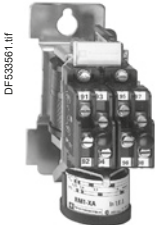
Single-pole magnetic over current relays



RM1XA0011



RM1XA1001  
+  
ER1XA2●



RM1XA0011  
+  
RM1ZH21

| Latching with manual reset                                                                                                                                                                                                        |             |                              |                                     |            |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|------------------------------|-------------------------------------|------------|
| With 1 C/O contact block, latching with manual reset                                                                                                                                                                              |             |                              |                                     |            |
| Recommended operating range (motor In)                                                                                                                                                                                            |             | Setting range (trip current) | Maximum continuous current ~ or --- | Reference  |
| A                                                                                                                                                                                                                                 |             | A                            | A                                   |            |
| ~ or ---                                                                                                                                                                                                                          | 0.7...1.15  | 1.25...4                     | 1.6                                 | RM1XA0011  |
|                                                                                                                                                                                                                                   | 1.16...1.8  | 2...6.3                      | 2.5                                 | RM1XA0021  |
|                                                                                                                                                                                                                                   | 1.9...2.9   | 3.2...10                     | 4                                   | RM1XA0041  |
|                                                                                                                                                                                                                                   | 3...4.6     | 5...16                       | 6.3                                 | RM1XA0061  |
|                                                                                                                                                                                                                                   | 4.7...7.2   | 8...25                       | 10                                  | RM1XA0101  |
|                                                                                                                                                                                                                                   | 7.3...11.5  | 12.5...40                    | 16                                  | RM1XA0161  |
|                                                                                                                                                                                                                                   | 11.6...18   | 20...63                      | 25                                  | RM1XA0251  |
|                                                                                                                                                                                                                                   | 18.1...29   | 32...100                     | 40                                  | RM1XA0401  |
|                                                                                                                                                                                                                                   | 29.1...46   | 50...160                     | 63                                  | RM1XA0631  |
|                                                                                                                                                                                                                                   | 46.1...72   | 80...250                     | 100                                 | RM1XA1001  |
| ~                                                                                                                                                                                                                                 | 73...115    | 125...400                    | 160                                 | RM1XA1601  |
|                                                                                                                                                                                                                                   | 116...145   | 160...500                    | 200                                 | RM1XA2001  |
|                                                                                                                                                                                                                                   | 146...230   | 250...800                    | 315                                 | RM1XA3151  |
|                                                                                                                                                                                                                                   | 231...360   | 400...1250                   | 500                                 | RM1XA5001  |
|                                                                                                                                                                                                                                   | 361...630   | 630...2200                   | 1000                                | RM1XA1011  |
|                                                                                                                                                                                                                                   | 631...1000  | 1000...4000                  | 1600                                | RM1XA1601  |
|                                                                                                                                                                                                                                   | 1001...1600 | 1600...6300                  | 2500                                | RM1XA2501  |
|                                                                                                                                                                                                                                   | 1601...2500 | 2500...10000                 | 4000                                | RM1XA4001  |
|                                                                                                                                                                                                                                   | 2501...4000 | 4000...16000                 | 6300                                | RM1XA6301  |
|                                                                                                                                                                                                                                   | 4001...6300 | 6300...25000                 | 10000                               | RM1XA10001 |
| Accessories (to be ordered separately)                                                                                                                                                                                            |             |                              |                                     |            |
| Description                                                                                                                                                                                                                       |             |                              |                                     | Reference  |
| 1 C/O contact block, latching                                                                                                                                                                                                     |             |                              |                                     | RM1ZH21    |
| Electrical reset <sup>(1)</sup><br>(consumption: inrush, sealed: 500 VA)<br>(fitted to the relay together with a latching contact block)<br>Basic reference. Complete with code indicating control circuit voltage <sup>(2)</sup> |             |                              |                                     | ER1XA2●    |
| <sup>(1)</sup> The impulse duration must not exceed 2 seconds within 10 minute intervals.<br><sup>(2)</sup> Standard coil voltages for electrical reset:                                                                          |             |                              |                                     |            |
| Volts                                                                                                                                                                                                                             | 110         | 220                          |                                     |            |
| 50 Hz                                                                                                                                                                                                                             | F           | M                            |                                     |            |

## Overload relays

Thermistor protection units for use with PTC thermistor probes <sup>(1)</sup>

LT3SE00M



LT3SA00M



LT3SM00M

## Protection units (without fault memory)

## Units with automatic reset with thermistor short-circuit detection

| Connection      | Voltage    | Output contact | Reference |
|-----------------|------------|----------------|-----------|
| Cage connectors | ~ 50/60 Hz | 115 V          | N/C       |
|                 |            | 230 V          | N/C       |
|                 | ---        | 24 V           | N/C       |

## Units with automatic reset with thermistor short-circuit detection

On front panel: fault and voltage signalling indicator.

| Connection      | Voltage              | Output contact | Reference |
|-----------------|----------------------|----------------|-----------|
| Cage connectors | ~ 50/60 Hz           | 115/230 V      | N/C + N/O |
|                 | ---                  | 24/48 V        | N/C + N/O |
|                 | ~ 50/60 Hz<br>or --- | 24...230 V     | 2 C/O     |

## Protection units (with fault memory)

## Units with manual reset with thermistor short-circuit detection

On front panel:

- fault and voltage signalling indicator,
- Test and Reset button.

| Connection      | Voltage              | Output contact | Reference |
|-----------------|----------------------|----------------|-----------|
| Cage connectors | ~ 50/60 Hz           | 400 V          | N/C + N/O |
|                 |                      | 24/48 V        | N/C + N/O |
|                 |                      | 115/230 V      | N/C + N/O |
|                 | ---                  | 24/48 V        | N/C + N/O |
|                 | ~ 50/60 Hz<br>or --- | 24...230 V     | 2 C/O     |

<sup>(1)</sup> PTC: Positive Temperature Coefficient.

Overload relays

Thermistor protection units for use with PTC thermistor probes <sup>(1)</sup>



| PTC thermistor probes <sup>(1)</sup>    |                                                 |             |                 |                      |
|-----------------------------------------|-------------------------------------------------|-------------|-----------------|----------------------|
| Description                             | Nominal Operating Temperature (NOT)<br>°C       | Colour      | Sold in lots of | Unit reference       |
| Integrated triple probes                | 90                                              | Green/green | 10              | DA1TT090             |
|                                         | 110                                             | Brown/brown | 10              | DA1TT110             |
|                                         | 120                                             | Grey/grey   | 10              | DA1TT120             |
|                                         | 130                                             | Blue/blue   | 10              | DA1TT130             |
|                                         | 140                                             | White/blue  | 10              | DA1TT140             |
|                                         | 150                                             | Black/black | 10              | DA1TT150             |
|                                         | 160                                             | Blue/red    | 10              | DA1TT160             |
|                                         | 170                                             | White/green | 10              | DA1TT170             |
| Surface probes                          | 60                                              | White/grey  | 10              | DA1TS060             |
|                                         | 70                                              | White/brown | 10              | DA1TS070             |
|                                         | 80                                              | White/white | 10              | DA1TS080             |
|                                         | 90                                              | Green/green | 10              | DA1TS090             |
|                                         | 100                                             | Red/red     | 10              | DA1TS100             |
| Accessories (to be ordered separately)  |                                                 |             |                 |                      |
| Mounting accessories                    |                                                 |             |                 |                      |
| Description                             | Applicationi                                    |             | Sold in lots of | Unit reference       |
| Adapter                                 | For fixing on C rail DZ5 MB                     |             | 10              | RHZ66                |
| Marking accessories                     |                                                 |             |                 |                      |
| Clip-in markers (maximum of 5 per unit) | Strips of 10 identical numbers (0 to 9)         |             | 25              | AB1R● <sup>(2)</sup> |
|                                         | Strips of 10 identical capital letters (A to Z) |             | 25              | AB1G● <sup>(2)</sup> |

<sup>(1)</sup> PTC: Positive Temperature Coefficient.  
<sup>(2)</sup> When ordering, replace the ● in the reference with the number or letter required.

## Overload relays

Electronic over current relays



LR97D07●●



LT4730●●●

## LR97D electronic over current relays

| Relay setting range | Usable range (1) | For use with contactor (2) | Relay supply voltage | Reference (3) |
|---------------------|------------------|----------------------------|----------------------|---------------|
| <b>A</b>            | <b>A</b>         |                            |                      |               |
| 0.3...1.5           | 0.3...1.3        | LC1 D09...D38              | ~ 200...240 V        | LR97D015M7    |
|                     |                  |                            | ~ 100...120 V        | LR97D015F7    |
|                     |                  |                            | ~/~ 24 V             | LR97D015B     |
|                     |                  |                            | ~/~ 48 V             | LR97D015E     |
| 1.2...7             | 1.2...6          | LC1 D09...D38              | ~ 200...240 V        | LR97D07M7     |
|                     |                  |                            | ~ 100...120 V        | LR97D07F7     |
|                     |                  |                            | ~/~ 24 V             | LR97D07B      |
|                     |                  |                            | ~/~ 48 V             | LR97D07E      |
| 5...25              | 5...21           | LC1 D09...D38              | ~ 200...240 V        | LR97D25M7     |
|                     |                  |                            | ~ 100...120 V        | LR97D25F7     |
|                     |                  |                            | ~/~ 24 V             | LR97D25B      |
|                     |                  |                            | ~/~ 48 V             | LR97D25E      |
| 20...38             | 20...34          | LC1 D25...D38              | ~ 200...240 V        | LR97D38M7     |
|                     |                  |                            | ~ 100...120 V        | LR97D38F7     |
|                     |                  |                            | ~/~ 24 V             | LR97D38B      |
|                     |                  |                            | ~/~ 48 V             | LR97D38E      |

## LT47 electronic over current relays

| Relay setting range                   | Usable range<br>(1) | Relay supply voltage | Reference |
|---------------------------------------|---------------------|----------------------|-----------|
| A                                     | A                   |                      |           |
| LT47 relay with manual/electric reset |                     |                      |           |
| 0.5...6                               | 0.5...5             | ~ 200...240 V        | LT4706M7S |
|                                       |                     | ~ 100...120 V        | LT4706F7S |
|                                       |                     | ---/~ 24 V           | LT4706BS  |
|                                       |                     | ---/~ 48 V           | LT4706ES  |
| 3...30                                | 3...25              | ~ 200...240 V        | LT4730M7S |
|                                       |                     | ~ 100...120 V        | LT4730F7S |
|                                       |                     | ---/~ 24 V           | LT4730BS  |
|                                       |                     | ---/~ 48 V           | LT4730ES  |
| 5...60                                | 5...50              | ~ 200...240 V        | LT4760M7S |
|                                       |                     | ~ 100...120 V        | LT4760F7S |
|                                       |                     | ---/~ 24 V           | LT4760BS  |
|                                       |                     | ---/~ 48 V           | LT4760ES  |
| LT47 relay with automatic reset       |                     |                      |           |
| 0.5...6                               | 0.5...5             | ~ 200...240 V        | LT4706M7A |
|                                       |                     | ~ 100...120 V        | LT4706F7A |
|                                       |                     | ---/~ 24 V           | LT4706BA  |
|                                       |                     | ---/~ 48 V           | LT4706EA  |
| 3...30                                | 3...25              | ~ 200...240 V        | LT4730M7A |
|                                       |                     | ~ 100...120 V        | LT4730F7A |
|                                       |                     | ---/~ 24 V           | LT4730BA  |
|                                       |                     | ---/~ 48 V           | LT4730EA  |
| 5...60                                | 5...50              | ~ 200...240 V        | LT4760M7A |
|                                       |                     | ~ 100...120 V        | LT4760F7A |
|                                       |                     | ---/~ 24 V           | LT4760BA  |
|                                       |                     | ---/~ 48 V           | LT4760EA  |

## Accessories (to be ordered separately)

| Description                                                                                  | For use with  | Sold in lots of | Unit reference |
|----------------------------------------------------------------------------------------------|---------------|-----------------|----------------|
| Pre-wiring kits allowing connection of the LR97D relay N/C contact directly to the contactor | LC1 D09...D18 | 10              | LAD7C1         |
|                                                                                              | LC1 D25...D38 | 10              | LAD7C2         |
| Terminal block for clip-on mounting on 35 mm rail (AM1 DP200)                                | LR97D         | 1               | LAD7B106       |

(1) To allow adjustment of the tripping sensitivity, see adjustment method (page B11/58).

(2) Please see chapter B8.

(3) If a pre-wiring kit is used, it is no longer possible to electrically wire signalling of tripped status.



## Technical Data for Designers

### Contents

|                                                       |                  |
|-------------------------------------------------------|------------------|
| General .....                                         | B11/22 to B11/27 |
| TeSys LRK - thermal overload protection:              |                  |
| > characteristics .....                               | B11/28 to B11/29 |
| > dimensions and schemes .....                        | B11/30           |
| TeSys LRD - thermal overload protection:              |                  |
| > presentation and characteristics .....              | B11/31 to B11/34 |
| > dimensions .....                                    | B11/35 to B11/37 |
| > schemes .....                                       | B11/37           |
| TeSys LR9D - electronic thermal overload protection:  |                  |
| > presentation and characteristics .....              | B11/38 to B11/41 |
| > dimensions .....                                    | B11/42           |
| > schemes .....                                       | B11/43           |
| TeSys LR9F - electronic thermal overload protection:  |                  |
| > presentation and characteristics .....              | B11/44 to B11/47 |
| > dimensions .....                                    | B11/48           |
| > schemes .....                                       | B11/49           |
| TeSys RM1 - single pole magnetic over current relays: |                  |
| > presentation and characteristics .....              | B11/50           |
| > dimensions and schemes .....                        | B11/51           |
| TeSys LT3 - thermistor protection unit:               |                  |
| > characteristics .....                               | B11/52 to B11/55 |
| > dimensions and schemes .....                        | B11/56 to B11/57 |
| TeSys LR97, LT47 - electronic over current relays:    |                  |
| > presentation .....                                  | B11/58           |
| > curves .....                                        | B11/59 to B11/60 |
| > characteristics .....                               | B11/60 to B11/61 |
| > dimensions and schemes .....                        | B11/62           |

### Introduction

Exceeding the operating limits of an electric motor will lead, eventually, not only to destruction of the motor itself but also of the mechanisms it drives.

This type of load can be the cause of electrical or mechanical faults.

■ **Electrical faults:**

- overvoltage, voltage drop, imbalance and phase failure which cause variations in the current drawn,
- short-circuits which can cause the current to reach levels capable of destroying the load.

■ **Mechanical faults:**

- locked rotor,
- brief or prolonged overload which leads to an increase in the current drawn by the motor, and therefore overheating.

The cost of these faults must take into account loss of production, loss of raw materials, repair of the production tool, poor quality of production and delays in delivery.

These faults can also have dramatic consequences on the safety of persons in direct or indirect contact with the motor.

To prevent these faults, protection measures are necessary. They make it possible to isolate the equipment to be protected from the mains supply by measuring variations in electrical values (voltage, current, etc.).

**Each motor starter must therefore have:**

■ **short-circuit protection**, to detect and break, as quickly as possible, abnormal currents generally greater than 10 times the rated current ( $I_n$ ).

■ **overload protection**, to detect increases in current up to about  $10 I_n$  and switch off the starter before overheating of the motor and conductors damages the insulation.

This protection is provided by specific devices such as fuses, circuit breakers and thermal overload relays, or by more integrated devices offering several types of protection.



# Overload relays

## Motor and machine protection

### Causes, effects and consequences of various faults

There are two types of fault:

■ Internal faults within the motor

■ External faults: these are located outside the electric motor but their consequences can lead to damage inside the motor.

| Faults                            | Causes                                                                                                                                                                                   | Effects                                                                                                                                                                            | Consequences on the motor and on the machine              |
|-----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|
| Short-circuit                     | Contact between several phases, or between one phase and neutral or between several turns of the same phase.                                                                             | <ul style="list-style-type: none"> <li>■ Current peak</li> <li>■ Electrodynamical forces on the conductors</li> </ul>                                                              | Destruction of windings                                   |
| Overvoltage                       | <ul style="list-style-type: none"> <li>■ Lightning</li> <li>■ Electrostatic discharge</li> <li>■ Operation</li> </ul>                                                                    | Dielectric breakdown in the windings                                                                                                                                               | Destruction of the windings due to loss of insulation     |
| Phase imbalance and phase failure | <ul style="list-style-type: none"> <li>■ Opening of a phase</li> <li>■ Single-phase load upstream of the motor</li> <li>■ Short-circuit between the turns of the same winding</li> </ul> | <ul style="list-style-type: none"> <li>■ Reduction of usable torque, efficiency and speed</li> <li>■ Increase in losses</li> <li>■ Starting impossible if phase failure</li> </ul> | Overheating <sup>(1)</sup>                                |
| High starting frequency           | <ul style="list-style-type: none"> <li>■ Failure of the automation system</li> <li>■ Too many manual control operations</li> <li>■ Numerous fault trips</li> </ul>                       | High stator and rotor temperature rise due to the frequent start current                                                                                                           | Overheating <sup>(1)</sup><br>Consequences on the process |
| Voltage variations                | <ul style="list-style-type: none"> <li>■ Instability of the mains voltage</li> <li>■ Connection of heavy loads</li> </ul>                                                                | <ul style="list-style-type: none"> <li>■ Reduction of usable torque</li> <li>■ Increase in losses</li> </ul>                                                                       | Overheating <sup>(1)</sup>                                |
| Harmonics                         | <ul style="list-style-type: none"> <li>■ Pollution of the mains supply by variable speed drives, inverters, etc...</li> </ul>                                                            | <ul style="list-style-type: none"> <li>■ Reduction of usable torque</li> <li>■ Increase in losses</li> </ul>                                                                       | Overheating <sup>(1)</sup>                                |
| Long starting time                | <ul style="list-style-type: none"> <li>■ Resistive torque too high (load too heavy)</li> <li>■ Voltage drop</li> </ul>                                                                   | Increase in starting time                                                                                                                                                          | Overheating <sup>(1)</sup>                                |
| Jamming                           | <ul style="list-style-type: none"> <li>■ Mechanical problem (crusher)</li> <li>■ Seizures</li> </ul>                                                                                     | Overcurrent                                                                                                                                                                        | Overheating <sup>(1)</sup><br>Consequences on the process |
| No-load running                   | <ul style="list-style-type: none"> <li>■ Pump running empty</li> <li>■ Mechanical break in drive to the load</li> </ul>                                                                  | Drop in current drawn                                                                                                                                                              | Consequences on the process                               |
| Frequency fluctuations            | <ul style="list-style-type: none"> <li>■ Overload of a supply powered by limited independent sources</li> <li>■ Faulty alternator speed regulator</li> </ul>                             | <ul style="list-style-type: none"> <li>■ Increase in losses</li> <li>■ Interferes with synchronous devices (clock, recorder, ...)</li> </ul>                                       | –                                                         |
| Overload                          | <ul style="list-style-type: none"> <li>■ Increase in resistive torque</li> <li>■ Voltage drop</li> <li>■ Drop in power factor</li> </ul>                                                 | Increase in current consumption                                                                                                                                                    | Overheating <sup>(1)</sup>                                |
| Loss of machine excitation        | <ul style="list-style-type: none"> <li>■ Significant drop in excitation current</li> <li>■ Break in rotor winding</li> </ul>                                                             | <ul style="list-style-type: none"> <li>■ Increase in active power</li> <li>■ Drop in power factor</li> </ul>                                                                       | Significant overheating of rotor and cage                 |
| Phase-Earth fault                 | <ul style="list-style-type: none"> <li>■ Accidental Phase-Earth contacts</li> <li>■ Accidental Phase-machine casing contacts (casing connected to earth)</li> </ul>                      | <ul style="list-style-type: none"> <li>■ Overvoltage developed in the mains supply</li> <li>■ Rise in earth potential (safety of persons)</li> </ul>                               | Consequences on safety of persons                         |

<sup>(1)</sup> Then, in the longer or shorter term, depending on the seriousness of the fault and/or its frequency, short-circuit and destruction of the windings.

# Overload relays

Motor and machine protection

## Protection functions

### Short-circuit protection

#### General

A short-circuit results in a very rapid rise in current which can reach several hundred times the value of the operational current. The consequences of a short-circuit are dangerous to both equipment and persons. It is therefore imperative to use protection devices to detect the fault and very quickly break the circuit.

Two types of protection are commonly used:

- fuses (cutout) which break the circuit by melting, which then requires their replacement,
  - magnetic trip circuit breakers, often more simply called "magnetic circuit breakers", which only require re-setting to put them back into service.
- Short-circuit protection can also be built-into multifunction devices such as motor circuit breakers and contactor-breakers.

The main characteristics of short-circuit protection devices are:

- their breaking capacity: this is the highest prospective short-circuit current value that a protection device can break at a given voltage.
  - their making capacity: this is the highest current value that the protection device can make at its rated voltage in specified conditions.
- The making capacity is equal to k times the breaking capacity.



LS1 D32  
fuse carrier



GS2 N3  
switch disconnectors

#### Fuses (cutouts)

Fuses provide individual phase protection (single-pole), with a high breaking capacity in a compact size:

- mounted either in fuse carriers,
- or in isolators, replacing the original links or shunt bars.

For motor protection, aM type fuses are used. Their design characteristics allow them to conduct the high magnetising currents that occur when motors are switched on. They are therefore unsuitable for overload protection (unlike gG type fuses). This is why an overload relay must be included in the motor power supply circuit.



GV2 L  
magnetic circuit-breaker



TeSys U LUB 12 starter with  
LUCA control unit

#### Magnetic circuit breakers

These circuit breakers protect installations against short-circuits, within the limit of their breaking capacity.

Magnetic circuit breakers provide omnipole breaking as standard.

For relatively low short-circuit currents, the operation of a circuit breaker is faster than that of fuses.

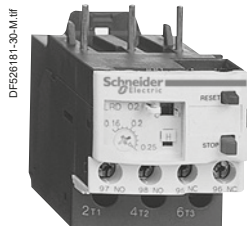
This protection conforms to standard IEC 60947-2.

The thermal and electrodynamic effects are also limited, therefore ensuring better protection of cables and equipment.

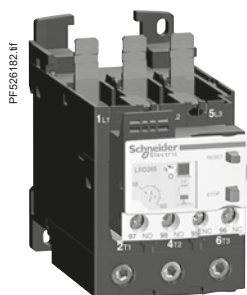
## General

# Overload relays

## Motor and machine protection



LRD 02  
thermal overload relay



LRD365  
thermal overload relay



RM4 JA current measurement relay



TeSys U starter with "thermal overload alarm" function module

## Protection functions

### Overload protection

#### General

An overload condition is the most frequently encountered fault. The symptoms are a rise in the current drawn by the motor and thermal effects. A rapid return to normal operating conditions is important.

The actual operating conditions (ambient temperature, operating altitude and type of standard duty) are essential to determine the operating values of the motor (power, current) and to be able to select effective overload protection. These operational values are given by the motor manufacturer.

According to the level required, protection can be provided by:

- overload relays and thermal overload relays (bi-metallic or electronic type) which protect motors in the event of:
  - overload, by monitoring the current drawn by each phase,
  - phase imbalance or failure, by their differential mechanism.
- relays with PTC thermistor probes (Positive Temperature Coefficient).
- overtorque relays,
- multifunction relays.

#### Overload relays

These relays protect motors against overload. They must allow the temporary overload that occurs on starting and must only trip if the starting time is abnormally long.

The overload relay will be selected according to the length of the starting time (tripping class) and the motor rating.

These relays have a thermal memory (except for certain electronic overload relays, indicated by their manufacturers) and can be connected:

- either in series with the load,
- or to current transformers placed in series with the load.

#### Bi-metallic thermal overload relays

Combined with a contactor, these relays protect the line and the equipment against small and prolonged overloads. They must be protected against strong overcurrent by a circuit breaker or fuses.

These relays may be used on an a.c. or d.c. system and are generally:

- 3-pole,
- compensated, i.e. insensitive to ambient temperature variations,
- with manual or automatic reset,
- graduated with a "motor FLC" scale: allowing direct setting to the full load current as shown on the motor rating plate.

They can also be sensitive to phase failure: this is known as 'differential'. This function conforms to standards IEC 60947-4-1 and 60947-6-2.

This type of relay is extremely reliable and is a relatively low cost device.

#### Electronic thermal overload relays

Electronic thermal overload relays have the advantage of electronics which allow a more complex thermal image of the motor to be created.

They can be combined with products having complementary functions, such as:

- temperature sensing via PTC probes,
- protection against jamming and overtorque,
- protection against phase reversal,
- earth fault protection,
- protection against no-load running,
- alarm function.

# Overload relays

Motor and machine protection



LT3S relays for use with thermistor probes



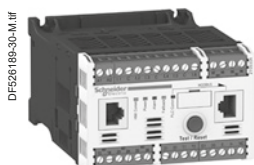
LR97D07 instantaneous electronic overcurrent relays



TeSys U LUB 32 starter with multifunction control unit LUC M



TeSys U controller LUTM 20BL



TeSys T controller LTM R08MBD

## Protection functions *(continued)*

### Overload protection *(continued)*

#### Relays for use with PTC thermistor probes

With direct sensing of the stator windings, these relays can be used to protect motors against:

- overload,
- a rise in ambient temperature,
- a ventilation circuit fault,
- a high starting frequency,
- mechanical shocks, etc.

### Overload (or overtorque) relays

These relays protect the drive line in the event of a locked rotor, seizure or mechanical shocks. This is an additional protection.

Unlike thermal overload relays, these relays do not have a thermal memory. They have definite time characteristics (adjustable current threshold and time delay).

The overtorque relay can be used as overload protection for motors with long starting times or very frequent starting (for example, lifting hoists).

### Multifunction relays

■ Overcurrent relays are limited when it is necessary to take into account problems associated with voltage, temperature or special applications. New production or maintenance management needs have prompted manufacturers to offer products which provide not only adaptable protection, but also complete management of the motor and its load.

They incorporate:

- current and voltage sensors (TeSys T controllers),
- hybrid analog and digital electronic technology,
- the use of communication buses for data exchange and control,
- powerful motor modelling algorithms,
- integrated application programs whose parameters can be set.

These products make it possible to reduce installation and operating costs by reducing maintenance and downtime.

### TeSys U starters:

The multifunction relay is incorporated in the motor starter.

This solution is very compact with reduced wiring. It is limited to 32 A.

### TeSys U controllers:

The multifunction relay is separate from the power line and reuses the function blocks from the TeSys U solution. It can be used in conjunction with a contactor up to 810 A.

### TeSys T controllers:

The multifunction relay is separate from the power line and incorporates inputs and outputs. It can be used in conjunction with a contactor up to 810 A.

## Overload relays

Motor and machine protection

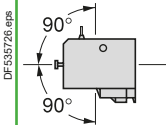
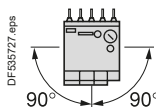
| Protection relay selection table |                                               |                                |                    |                              |                    |
|----------------------------------|-----------------------------------------------|--------------------------------|--------------------|------------------------------|--------------------|
| Relay type                       | Motor protection                              |                                | Machine protection | Motor and machine protection |                    |
|                                  | Thermal overload relay                        | Relays for use with PTC probes | Overtorque relays  | TeSys U controller           | TeSys T controller |
|                                  | LR2 K, LRD, LRD3, LR9 F, LR9 D <sup>(1)</sup> | LT3 S                          | LR97D, LT47        | LUT M                        | LTM R              |
| Causes of overheating            | (2)                                           |                                | (2)                | (2)                          | (3)                |
| Slight overload                  |                                               |                                |                    |                              |                    |
| Locked rotor                     |                                               |                                |                    |                              |                    |
| No-load running                  |                                               |                                |                    |                              |                    |
| Supply phase failure             |                                               |                                | LR9 7D             |                              |                    |
| Ventilation fault                |                                               |                                |                    |                              | With probes        |
| Abnormal temperature rise        |                                               |                                |                    |                              | With probes        |
| Shaft bearing seizure            |                                               |                                |                    |                              | With probes        |
| Insulation fault                 |                                               |                                |                    |                              |                    |
| Protracted starting time         |                                               |                                |                    |                              |                    |
| Severe duty                      |                                               |                                |                    |                              | With probes        |
| Voltage variation                |                                               |                                |                    |                              |                    |
| Frequency fluctuations           |                                               |                                |                    |                              |                    |
| Loss of machine excitation       |                                               |                                |                    |                              |                    |

|  |                              |
|--|------------------------------|
|  | Ideally suited               |
|  | Possible solution            |
|  | Not suitable (no protection) |

<sup>(1)</sup> For motor circuit breaker type **GV2ME**.<sup>(2)</sup> Protection based on current.<sup>(3)</sup> Protection based on current and voltage.

# Overload relays

Thermal overload relays for TeSys K contactors - adjustable from 0.11 to 16 A

| Environment                                        |                                           |     |                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                            |                             |
|----------------------------------------------------|-------------------------------------------|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|
| Conforming to standards                            |                                           |     | IEC/EN 60947-4-1, IEC/EN 60947-5-1, UL 60947-4-1, CSA C22.2 n° 60947-4-1, UL 60947-5-1, CSA C22.2 n° 60947-5-1, GB/T14048.                                                                                                                                                                                                                                                                                         |                                                                                                                                                            |                             |
| Product certifications                             |                                           |     | UL , CSA, CCC, EAC, CB certification                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                            |                             |
| Degree of protection                               | Conforming to IEC 60529                   |     | Protection against direct finger contact                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                            |                             |
| Ambient air temperature around the device          | Storage                                   | °C  | -40...+70                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                            |                             |
|                                                    | For normal operation (IEC 60947)          | °C  | -20...+55 (without derating)                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                            |                             |
|                                                    | Operating limit                           | °C  | -30...+60 (with derating) <sup>(1)</sup>                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                            |                             |
| Maximum operating altitude                         | Without derating                          | m   | 2000                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                            |                             |
| Operating positions                                |                                           |     | <div><b>Vertical axis</b><br/><br/>Without derating</div>                                                                                                                                                                                                                                                                         | <div><b>Horizontal axis</b><br/><br/>With derating <sup>(1)</sup></div> |                             |
| Flame resistance                                   | Conforming to 60695-2-11                  | °C  | 850                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                            |                             |
| Shock resistance, hot state (1/2 sine wave, 11 ms) | Conforming to IEC 60068-2-27, N/C contact |     | 10 gn                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                            |                             |
|                                                    | Conforming to IEC 60068-2-27, N/O contact |     | 10 gn                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                            |                             |
| Vibration resistance, hot state 5 to 300 Hz        | Conforming to IEC 60068-2-6, N/C contact  |     | 2 gn                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                            |                             |
|                                                    | Conforming to IEC 60068-2-6, N/O contact  |     | 2 gn                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                            |                             |
| Cabling<br>Screw clamp terminals                   |                                           |     | <b>Minimum</b>                                                                                                                                                                                                                                                                                                                                                                                                     | <b>Maximum</b>                                                                                                                                             | <b>Maximum to IEC 60947</b> |
|                                                    | Solid cable                               | mm² | 1 x 1.5                                                                                                                                                                                                                                                                                                                                                                                                            | 2 x 4                                                                                                                                                      | 1 x 4 + 1 x 2.5             |
|                                                    | Flexible cable without cable end          | mm² | 1 x 0.75                                                                                                                                                                                                                                                                                                                                                                                                           | 2 x 4                                                                                                                                                      | 2 x 2.5                     |
|                                                    | Flexible cable with cable end             | mm² | 1 x 0.34                                                                                                                                                                                                                                                                                                                                                                                                           | 1 x 1.5 + 1 x 2.5                                                                                                                                          | 1 x 1.5 + 1 x 2.5           |
| Tightening torque                                  | Philips head n° 2 - Ø6                    | N.m | 0.8                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                            |                             |
| Mounting                                           |                                           |     | Directly under the contactor or reversing contactor                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                            |                             |
| Connections                                        |                                           |     | Made automatically when mounted under the contactor, as follows:<br>■ contactor terminal A2 connected to overload relay terminal 96 on all products,<br>■ contactor terminal 14 connected to overload relay terminal 95 on products with 3 P + N/O.<br>When using 3 P + N/C, or 4 P contactors, or the N/O auxiliary contact marked 13-14, at a voltage other than the coil voltage, break off the link marked 14. |                                                                                                                                                            |                             |

| Auxiliary contact characteristics                                                                       |                                                             |    |               |     |     |         |     |         |         |
|---------------------------------------------------------------------------------------------------------|-------------------------------------------------------------|----|---------------|-----|-----|---------|-----|---------|---------|
| Number of contacts                                                                                      |                                                             |    | 1 N/C + 1 N/O |     |     |         |     |         |         |
| Conventional thermal current                                                                            |                                                             | A  | 6             |     |     |         |     |         |         |
| Short-circuit protection                                                                                | Conforming to IEC 60947 gG fuse or circuit breaker GB2 CB●● | A  | 6 max.        |     |     |         |     |         |         |
| Maximum power of the controlled contactor coils (sealed) (Occasional operating cycles of contact 95-96) | a.c.                                                        | V  | 24            | 48  | 110 | 220/230 | 400 | 415/440 | 600/690 |
|                                                                                                         |                                                             | VA | 100           | 200 | 400 | 600     | 600 | 600     | 600     |
|                                                                                                         | d.c.                                                        | V  | 24            | 48  | 110 | 220     | 250 | —       | —       |
|                                                                                                         |                                                             | W  | 100           | 100 | 50  | 45      | 35  | —       | —       |
| Maximum operational voltage                                                                             | a.c., category AC-15                                        | V  | 690           |     |     |         |     |         |         |
|                                                                                                         | d.c., category DC-13                                        | V  | 250           |     |     |         |     |         |         |

(1) Please consult your Regional Sales Office.  
(2) Very low safety voltage.

## Overload relays

Thermal overload relays for TeSys K contactors - adjustable from 0.11 to 16 A

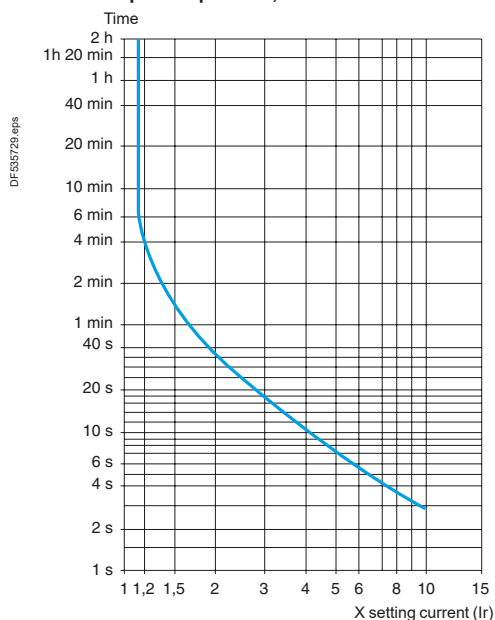
| Electrical characteristics of the power circuit |                                                    |    |           |
|-------------------------------------------------|----------------------------------------------------|----|-----------|
| Rated operational voltage (Ue)                  | Up to                                              | V  | 690       |
| Rated insulation voltage (Ui)                   | Conforming to IEC 60947                            | V  | 690       |
|                                                 | Conforming to UL 60947-4-1, CSA C22.2 n° 60947-4-1 | V  | 600       |
| Rated impulse withstand voltage (Uimp)          |                                                    | kV | 6         |
| Frequency limits of the operational current     |                                                    | Hz | Up to 400 |
| Power dissipated per pole                       |                                                    | W  | 2         |

| Operating characteristics                 |                             |   |                                                                                                                                                                                        |
|-------------------------------------------|-----------------------------|---|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Tripping threshold                        | Conforming to IEC 60947-4-1 | A | 1.14 ±0.06 I <sub>r</sub>                                                                                                                                                              |
| Sensitivity to phase failure              | Conforming to IEC 60947     |   | Yes                                                                                                                                                                                    |
| Reset                                     | Manual or automatic         |   | Selected by means of a lockable and sealable switch on the front of the relay                                                                                                          |
| Signalling                                | On front of relay           |   | Trip indicator                                                                                                                                                                         |
| Reset-Stop function                       |                             |   | Pressing the Reset-Stop button:<br>- actuates the N/C contact<br>- has no effect on the N/O contact                                                                                    |
| Test function                             | By pushbutton               |   | Pressing the Test button enables:<br>- checking of the control circuit wiring<br>- simulation of overload tripping (actuation of both N/C and N/O contacts, and of the trip indicator) |
| Short-circuit protection and coordination |                             |   | See pages A6/11 and A6/20                                                                                                                                                              |

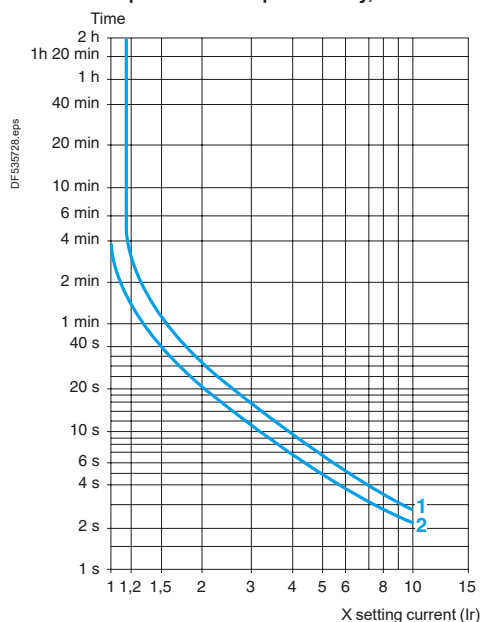
### Tripping curves

Average operating time related to multiples of the current setting (Class 10 A)

Balanced 3-phase operation, from cold state



Balanced operation with 2 phases only, from cold state



Setting: at lower end of scale

Setting: at upper end of scale

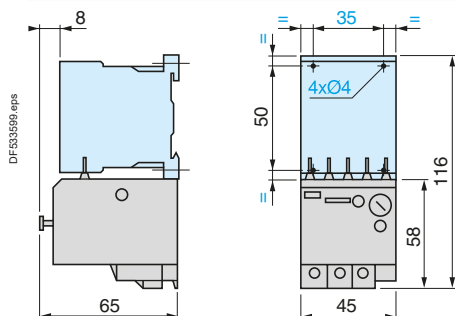
## Overload relays

Thermal overload relays for TeSys K contactors - adjustable from 0.11 to 16 A

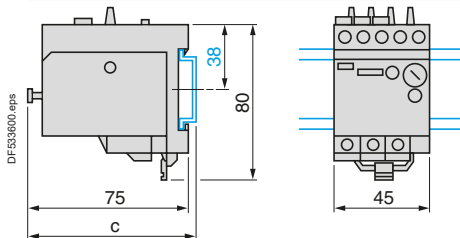
### Dimensions, mounting

#### LR2 K

Direct mounting beneath the contactor



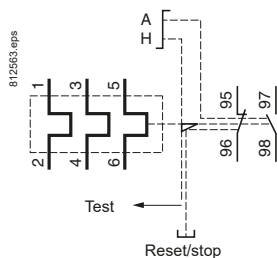
Separate mounting with terminal block LA7 K0064 on 35 mm rail (AM1DP200 or AM1DE200)



| AM1   | c    |
|-------|------|
| DP200 | 78.5 |
| DE200 | 86   |

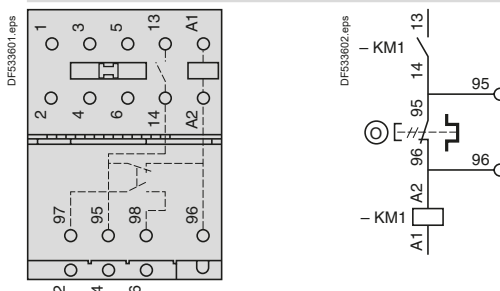
### Schemes

#### LR2 K

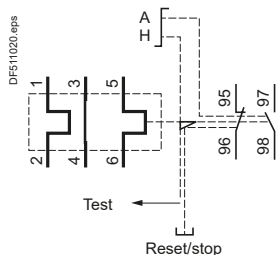


#### LR2 K + LC• K

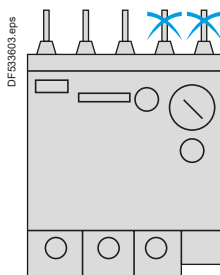
Pre-wiring scheme



#### LR7 K



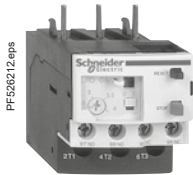
**Note:** If pre-wiring is not required, break off the 2 links located on the thermal overload relay.





## Overload relays

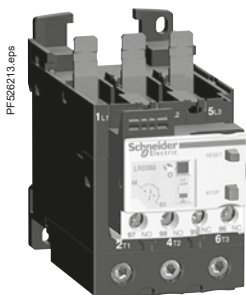
3-pole thermal overload relays for TeSys D contactors



LRD 08

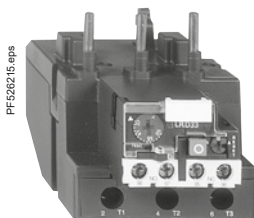


LRD04L...32L

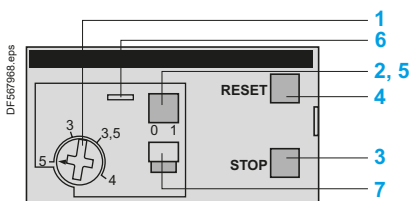


LRD365

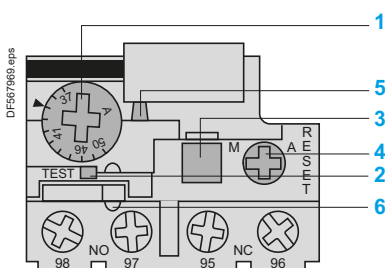
**EverLink®**



LRD33●●



LRD 01...35, LRD04L...32L  
LRD313...LRD365



LRD3361...4369, LR2 D3561...3563

### Presentation

3-pole TeSys D thermal overload relays are designed to protect a.c. circuits and motors against:

- overloads
- phase failure
- excessively long starting times
- prolonged stalled rotor condition.

### Power connection

#### LRD01 to LRD35

LRD01 to 35 relays are designed for connection by screw clamp terminals. They can be supplied for connection by spring terminals or by lugs <sup>(1)</sup>.

#### LRD04 to LRD32L

These relays are designed for connection by screw clamp terminals. They can be supplied for connection by lugs <sup>(1)</sup>.

#### LRD313 to LRD380 <sup>(3)</sup>

These relays are for connection by BTR screw connectors (hexagon socket head). The screws are tightened by means of a size 4, insulated Allen key.

This type of connection uses the **EverLink®** system with creep compensation <sup>(2)</sup> (Schneider Electric patent).

This technique makes it possible to achieve accurate and durable tightening torque.

These relays are also available for connection by lugs <sup>(1)</sup>.

#### LRD3361 to 4369, LR2 D3561 to D3563

LRD3361 to 4369 and LR2 D3561 to D3563 relays are designed for connection by screw clamp terminals. They can be supplied for connection by lugs <sup>(1)</sup>.

### Description

TeSys D3-pole thermal overload relays are designed to protect a.c. circuits and motors against overloads, phase failure, long starting times and prolonged stalling of the motor.

- 1 Adjustment dial Ir.
- 2 Test button.  
Operation of the Test button allows:
  - checking of control circuit wiring,
  - simulation of relay tripping (actuates both the N/O and N/C contacts).
- 3 Stop button. Actuates the N/C contact; does not affect the N/O contact.
- 4 Reset button.
- 5 Trip indicator.
- 6 Setting locked by sealing the cover.
- 7 Selector for manual or automatic reset.

LRD01 to 35, LRD04L to 32L and LRD313 to LRD380 <sup>(3)</sup> relays are supplied with the selector in the manual position, protected by a cover. Deliberate action is required to move it to the automatic position.

<sup>(1)</sup> Connection by lugs meets the requirements of certain Asian markets and is suitable for applications subject to strong vibration, such as railway transport.

<sup>(2)</sup> Creep: normal crushing phenomenon of copper conductors, that is accentuated over time.

<sup>(3)</sup> LRD380 available end 2017.

# Overload relays

3-pole thermal overload relays for TeSys D contactors

| Environment                               |                                                         |    |                                                                                                                                                |
|-------------------------------------------|---------------------------------------------------------|----|------------------------------------------------------------------------------------------------------------------------------------------------|
| Conforming to standards                   |                                                         |    | IEC/EN 60947-4-1, IEC/EN 60947-5-1, UL 60947-4-1, CSA C22.2 n° 60947-4-1<br>UL 60947-5-1, CSA C22.2 n° 60947-5-1, ATEX EN 50495 <sup>(1)</sup> |
| Product certifications                    |                                                         |    | UL <sup>(4)</sup> , CSA <sup>(4)</sup><br>CCC, EAC<br>ATEX INERIS <sup>(1)</sup><br>DNV-GL, BV, ABS, LRoS                                      |
| Degree of protection (front face)         | Conforming to IEC 60529                                 |    | Protection against direct finger contact IP20                                                                                                  |
| Climatic withstand                        |                                                         |    | Conforming to IACS E10                                                                                                                         |
| Ambient air temperature around the device | Storage                                                 | °C | -60...+70                                                                                                                                      |
|                                           | Normal operation, without derating (IEC 60947-4-1)      | °C | -20...+60                                                                                                                                      |
|                                           | Minimum /maximum operating temperatures (with derating) | °C | -20...+70                                                                                                                                      |
| Operating positions without derating      | In relation to normal vertical mounting plane           |    | Any position.<br>When mounting on a vertical rail, use a stop.                                                                                 |
| Flame resistance                          | Conforming to 60695-2-11                                | °C | 850                                                                                                                                            |
| Shock resistance                          | Permissible acceleration conforming to IEC 60068-2-7    |    | 15 gn - 11 ms                                                                                                                                  |
| Vibration resistance <sup>(2)</sup>       | Permissible acceleration conforming to IEC 60068-2-6    |    | 6 gn<br>except LRD04L...LRD32L: 3 gn                                                                                                           |
| Dielectric strength at 50 Hz              | Conforming to IEC 60255-5                               | kV | 6                                                                                                                                              |
| Surge withstand                           | Conforming to IEC 60801-5                               | kV | 6                                                                                                                                              |

| Electrical characteristics of power circuit |                                       |    |                                    |                  |                                    |                                       |                    |                                              |                          |                         |
|---------------------------------------------|---------------------------------------|----|------------------------------------|------------------|------------------------------------|---------------------------------------|--------------------|----------------------------------------------|--------------------------|-------------------------|
| Relay type                                  |                                       |    | LRD01<br>...16,<br>LR3D01<br>...16 | LRD04L<br>...32L | LRD21<br>...35,<br>LR3D21<br>...35 | LRD313<br>...365<br>LR3D<br>313 ...38 | LRD313L<br>...365L | LRD3322<br>...33696<br>LR3D3322<br>... 33696 | LR2D<br>3522<br>... 3563 | LRD<br>4365<br>... 4369 |
| Tripping class                              | Conforming to UL508,<br>IEC 60947-4-1 |    | 10 A                               | 20               | 10 A                               | 10 A                                  | 20                 | 10 A                                         | 20                       | 10 A                    |
| Rated insulation voltage (Ui)               | Conforming to IEC 60947-4-1           | V  | 690                                |                  |                                    |                                       |                    |                                              | 1000 <sup>(3)</sup>      |                         |
|                                             | Conforming to UL, CSA                 | V  | 600                                |                  |                                    |                                       |                    |                                              |                          |                         |
| Rated impulse withstand voltage (Uimp)      |                                       | kV | 6                                  |                  |                                    |                                       |                    |                                              |                          |                         |
| Rated operational voltage (Ue)              |                                       | V  | 690                                |                  |                                    |                                       |                    |                                              |                          |                         |
| Frequency limits                            | Of the operating current              | Hz | 0...400                            |                  |                                    |                                       |                    |                                              |                          |                         |
| Setting range                               | Depending on model                    | A  | 0.1...13                           | 0.63...32        | 12...38                            | 9...80                                | 9...65             | 17...140                                     | 17...80                  | 80...140                |

| Auxiliary contact characteristics                                                                                      |                                           |   |      |     |      |      |      |      |  |
|------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|---|------|-----|------|------|------|------|--|
| Conventional thermal current                                                                                           |                                           | A | 5    |     |      |      |      |      |  |
| Max. sealed consumption of the operating coils of controlled contactors (Occasional operating cycles of contact 95-96) | a.c. supply, AC-15                        | V | 120  | 240 | 380  | 480  | 500  | 600  |  |
|                                                                                                                        |                                           | A | 3    | 1.5 | 0.95 | 0.75 | 0.72 | 0.12 |  |
|                                                                                                                        | d.c. supply, DC-13                        | V | 125  | 250 | 440  |      |      |      |  |
|                                                                                                                        |                                           | A | 0.22 | 0.1 | 0.06 |      |      |      |  |
| Protection against short-circuits                                                                                      | By gG, BS fuses. Maximum rating or by GB2 | A | 5    |     |      |      |      |      |  |

(1) For relays LRD01 to LRD380, LRD3322 to LRD3365, LRD04L to LRD32L, LRD4365 to LRD4369, LRD33656 to LRD33696.

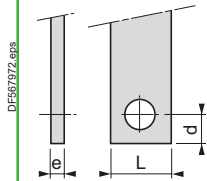
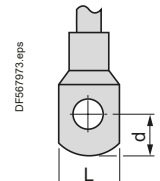
(2) In case of vibration above 3gn on TeSys D Green contactor directly mounted with LRD, it is recommended to mount the devices separately by screws on metal plate.

(3) 750 V for LRD33656, LRD33676, LRD33696.

(4) Except for relays LRD4369.

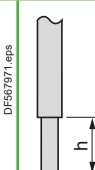
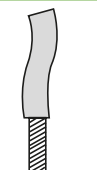
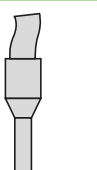
# Overload relays

3-pole thermal overload relays for TeSys D contactors

| Power circuit connection characteristics                                    |                   |                                     |                                                                                    |                                    |                                                                                      |                                                              |                                                                                      |                                                      |                             |                        |
|-----------------------------------------------------------------------------|-------------------|-------------------------------------|------------------------------------------------------------------------------------|------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------|--------------------------------------------------------------------------------------|------------------------------------------------------|-----------------------------|------------------------|
| Relay type                                                                  |                   | LRD01<br>...16,<br>LR3D01<br>...16  | LRD04L<br>...21L                                                                   | LRD22L<br>...32L                   | LRD21<br>...35,<br>LR3D21<br>...35                                                   | LRD<br>313<br>...365<br>LR3D<br>313<br>...380 <sup>(2)</sup> | LRD<br>313L<br>...365L                                                               | LRD<br>3322<br>...33696<br>LR3D<br>3322 ...<br>33696 | LR2D<br>3522 ...<br>...3563 | LRD<br>4365<br>...4369 |
| Connection to screw clamp terminals                                         |                   |                                     |                                                                                    |                                    |                                                                                      |                                                              |                                                                                      |                                                      |                             |                        |
| Flexible cable without cable end                                            | 1 conductor       | mm <sup>2</sup>                     | 1.5...10                                                                           |                                    | 1.5...10                                                                             | 1...35                                                       | 1...35                                                                               | 4...35                                               |                             | 4...50                 |
| Flexible cable with cable end                                               | 1 conductor       | mm <sup>2</sup>                     | 1...4                                                                              | 1...6                              | 1...6<br>except<br>LRD21:<br>1...4                                                   | 1...35                                                       | 1...35                                                                               | 4...35                                               |                             | 4...35                 |
| Solid cable without cable end                                               | 1 conductor       | mm <sup>2</sup>                     | 1...6                                                                              | 1.5...10                           | 1.5/10<br>except<br>LRD21:<br>1/6                                                    | 1...35                                                       | 1...35                                                                               | 4...35                                               |                             | 4...50                 |
| Tightening torque                                                           |                   | N.m                                 | 1.7                                                                                | 2.5                                | 2.5                                                                                  | 1...25:<br>5 35: 8                                           | 1...25:<br>5 35: 8                                                                   | 9                                                    | 9                           | 9                      |
| Connection to spring terminals (Min/max c.s.a.)<br>(except LRD04L...LRD32L) |                   |                                     |                                                                                    |                                    |                                                                                      |                                                              |                                                                                      |                                                      |                             |                        |
| Flexible cable without cable end                                            | 1 conductor       | mm <sup>2</sup>                     | 1.5...4                                                                            | —                                  | 1.5...4                                                                              | —                                                            | —                                                                                    | —                                                    | —                           | —                      |
| Flexible cable with cable end                                               | 1 conductor       | mm <sup>2</sup>                     | 1.5...4                                                                            | —                                  | 1.5...4                                                                              | —                                                            | —                                                                                    | —                                                    | —                           | —                      |
| Connection by bars or lugs                                                  |                   |                                     |                                                                                    |                                    |                                                                                      |                                                              |                                                                                      |                                                      |                             |                        |
|                                                                             |                   |                                     |  |                                    |  |                                                              |  |                                                      |                             |                        |
| Relay type                                                                  |                   | LRD016...166<br>LRD04L6<br>... 16L6 | LRD216...356<br>LRD21L6<br>... 32L6                                                | LRD3136<br>... 3806 <sup>(2)</sup> | LRD313L6<br>... 365L6                                                                | LRD3322A66<br>... 3365A66                                    |                                                                                      |                                                      |                             |                        |
| Pitch                                                                       | Without spreaders | mm                                  | 14.5                                                                               | 17.5                               | 17.5                                                                                 | 17.5                                                         | 21.5                                                                                 |                                                      |                             |                        |
| Bars or cables with lugs                                                    | e                 | mm                                  | ≤ 6                                                                                | ≤ 6                                | ≤ 6                                                                                  | ≤ 6                                                          | ≤ 6                                                                                  |                                                      |                             |                        |
|                                                                             | L                 | mm                                  | ≤ 8                                                                                | ≤ 8                                | ≤ 13.5                                                                               | ≤ 13.5                                                       | ≤ 16                                                                                 |                                                      |                             |                        |
|                                                                             | L'                | mm                                  | ≤ 9.5                                                                              | ≤ 9.5                              | ≤ 16.5                                                                               | ≤ 16.5                                                       | ≤ 16                                                                                 |                                                      |                             |                        |
|                                                                             | d                 |                                     | ≤ 7                                                                                | ≤ 7                                | ≤ 10                                                                                 | ≤ 10                                                         | ≤ 12                                                                                 |                                                      |                             |                        |
| Screws                                                                      |                   |                                     | M4                                                                                 | M4                                 | M6                                                                                   | M6                                                           | M10                                                                                  |                                                      |                             |                        |
|                                                                             | Tightening torque | N.m                                 | 1.7                                                                                | 2.5                                | 6                                                                                    | 6                                                            | 11.3                                                                                 |                                                      |                             |                        |

## Control circuit connection characteristics

### Connection to screw clamp terminals or spring terminals

|                                                                             |                                  |                                    |                                                                                     |                                                                                     |                                                                                       |                                                              |                        |                                                  |                          |                        |
|-----------------------------------------------------------------------------|----------------------------------|------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------------------------------------------------------|------------------------|--------------------------------------------------|--------------------------|------------------------|
| Bare cables                                                                 |                                  |                                    |  |  |  |                                                              |                        |                                                  |                          |                        |
| Relay type                                                                  |                                  | LRD01<br>...16,<br>LR3D01<br>...16 | LRD04L<br>...21L                                                                    | LRD22L<br>...32L                                                                    | LRD21<br>...35,<br>LR3D21<br>...35                                                    | LRD<br>313<br>...365<br>LR3D<br>313<br>...380 <sup>(2)</sup> | LRD<br>313L<br>...365L | LRD3322<br>...33696<br>LR3D<br>3322 ...<br>33696 | LR2D<br>3522 ...<br>3563 | LRD<br>4365<br>...4369 |
| Connection to screw clamp terminals <sup>(1)</sup>                          | Solid cable without cable end    | mm <sup>2</sup>                    | 2 x 1...2.5                                                                         |                                                                                     |                                                                                       |                                                              |                        |                                                  |                          |                        |
|                                                                             | Flexible cable without cable end | mm <sup>2</sup>                    | 2 x 1...2.5                                                                         |                                                                                     |                                                                                       |                                                              |                        |                                                  |                          |                        |
|                                                                             | Flexible cable with cable end    | mm <sup>2</sup>                    | 2 x 1...2.5                                                                         |                                                                                     |                                                                                       |                                                              |                        |                                                  |                          |                        |
| Tightening torque                                                           |                                  | N.m                                | 1.7                                                                                 |                                                                                     |                                                                                       |                                                              |                        |                                                  |                          |                        |
| Connection to spring terminals (Min/max c.s.a.)<br>(except LRD04L...LRD32L) | Solid cable                      | mm <sup>2</sup>                    | 1...2.5                                                                             | —                                                                                   | 1...2.5                                                                               |                                                              | —                      |                                                  |                          |                        |
|                                                                             | Flexible cable without cable end | mm <sup>2</sup>                    | 1...2.5                                                                             | —                                                                                   | 1...2.5                                                                               |                                                              | —                      |                                                  |                          |                        |

(1) For relays **LRD313 to 380**<sup>(2)</sup>: BTR hexagon socket head screws, **EverLink®** system.  
In accordance with local electrical wiring regulations, a size 4 insulated Allen key must be used (reference **LADALLEN4**, see page B8/29).

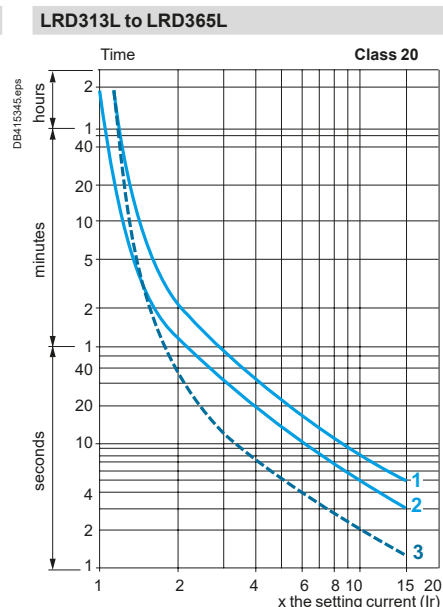
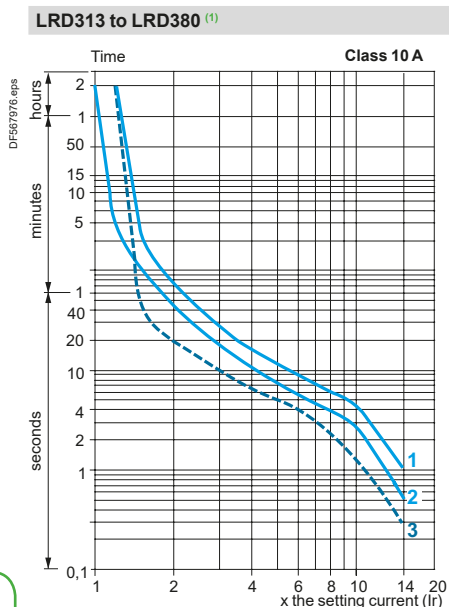
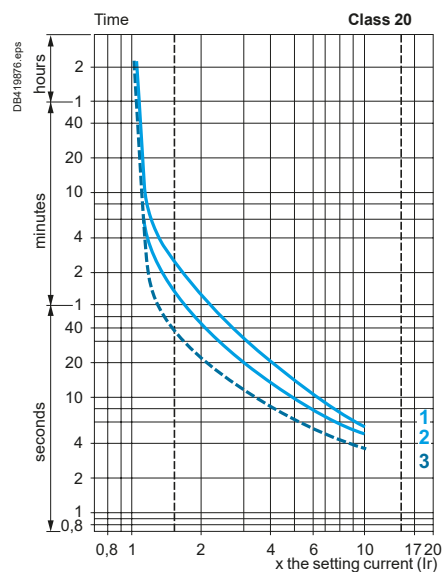
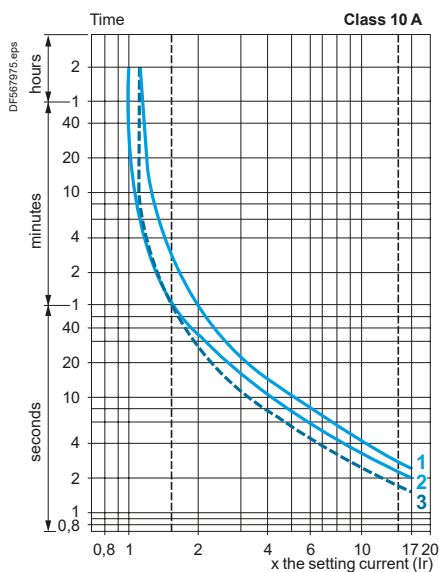
(2) **LRD380** available end 2017.

## Overload relays

3-pole thermal overload relays for TeSys D contactors

| Operating characteristics    |                             |                                    |                                                                   |                                    |                                                          |                    |                                              |                             |                        |
|------------------------------|-----------------------------|------------------------------------|-------------------------------------------------------------------|------------------------------------|----------------------------------------------------------|--------------------|----------------------------------------------|-----------------------------|------------------------|
| Relay type                   |                             | LRD01<br>...16,<br>LR3D01<br>...16 | LRD04L...<br>LRD32L                                               | LRD21<br>...35,<br>LR3D21<br>...35 | LRD313<br>...365<br>LR3D<br>313<br>...380 <sup>(1)</sup> | LRD313L<br>...365L | LRD3322<br>...33696<br>LR3D3322<br>... 33696 | LR2D<br>3522<br>...<br>3563 | LRD<br>4365<br>...4369 |
| Temperature compensation     |                             | °C                                 | -20...+60                                                         |                                    |                                                          |                    |                                              |                             |                        |
| Tripping threshold           | Conforming to IEC 60947-4-1 | A                                  | 1.14 ±0.06 Ir                                                     |                                    |                                                          |                    |                                              |                             |                        |
| Sensitivity to phase failure |                             |                                    | Tripping current 130 % of Ir on two phases, the third phase at 0. |                                    |                                                          |                    |                                              |                             |                        |

| Tripping curves                                                    |                                           |
|--------------------------------------------------------------------|-------------------------------------------|
| Average operating time related to multiples of the setting current |                                           |
| LRD 01 to LRD35, LR2 D and LRD3322 to LRD4369                      | LRD04L to LRD32L and LR2D3522 to LR2D3563 |



- 1 Balanced operation, 3-phase, without prior current flow (cold state).  
 2 2-phase operation, without prior current flow (cold state).  
 3 Balanced operation, 3-phase, after a long period at the set current (hot state).

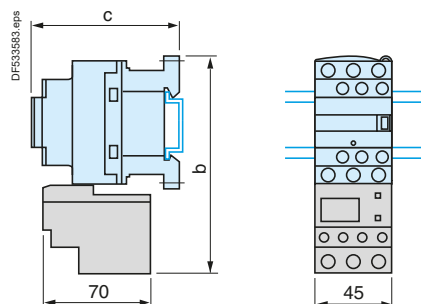
(1) LRD380 available end 2017.

## Overload relays

3-pole thermal overload relays for TeSys D contactors

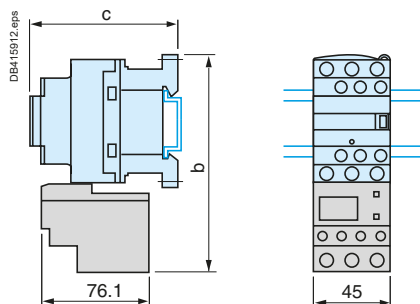
### LRD01...35 <sup>(1)</sup>

Direct mounting beneath contactors with screw clamp connections



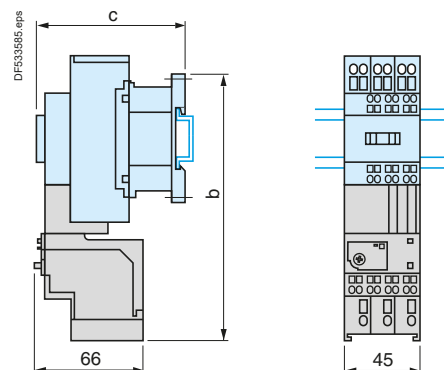
### LRD04...32L <sup>(1)</sup>

Direct mounting beneath contactors with screw clamp connections



### LRD013...223

Direct mounting beneath contactors with spring terminal connections



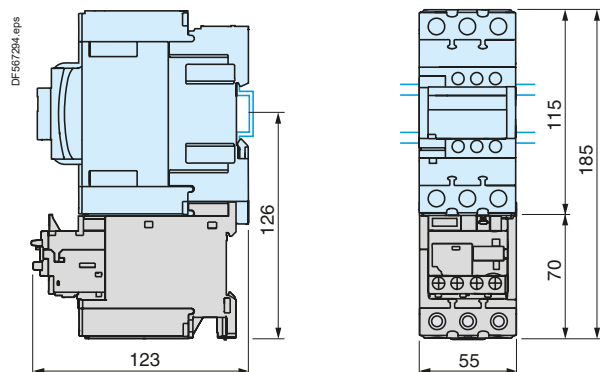
| LC1 | D09...D18                  | D25...D38 |
|-----|----------------------------|-----------|
| b   | 123                        | 137       |
| c   | See pages B11/32 and B8/75 |           |

| LC1 | D09...D18                  | D25...D38 |
|-----|----------------------------|-----------|
| b   | 123                        | 137       |
| c   | See pages B11/32 and B8/75 |           |

| LC1 | D093...D253                |
|-----|----------------------------|
| b   | 168                        |
| c   | See pages B11/32 and B8/75 |

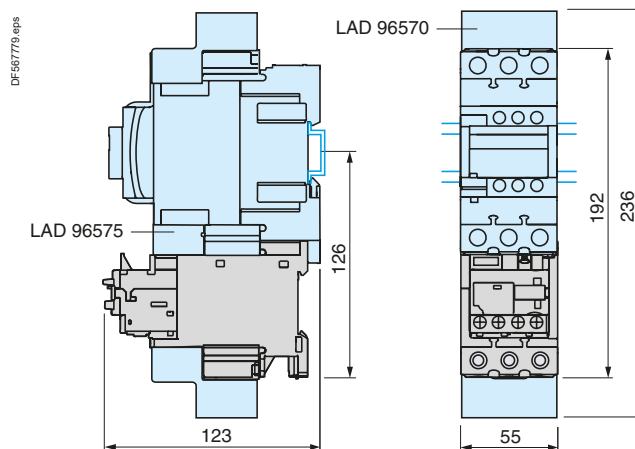
### LRD313 ...380 <sup>(1) (2)</sup>

Direct mounting beneath contactors LC1D40A...D80A <sup>(2)</sup> with screw clamp connections or EverLink® connectors



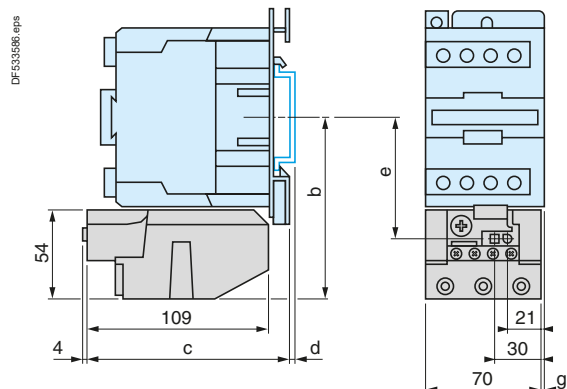
### LRD3136 ...3806 <sup>(1) (2)</sup>

Direct mounting beneath contactors LC1D40A6...D80A6 <sup>(2)</sup> with lugs



### LRD33...●●●

Direct mounting beneath contactors LC1D80...D95



| AM1 | DL201 | DL200 |
|-----|-------|-------|
| d   | 7     | 17    |

#### Control circuit AC

|        | b     | c   | e    | g (tri) | g (tetra) |
|--------|-------|-----|------|---------|-----------|
| LC1D80 | 115.5 | 124 | 76.9 | 9.5     | 22        |
| LC1D95 | 115.5 | 124 | 76.9 | 9.5     | -         |

#### Control circuit DC

|             |       |       |      |     |    |
|-------------|-------|-------|------|-----|----|
| LC1D80, D95 | 115.5 | 179.4 | 76.9 | 9.5 | 22 |
|-------------|-------|-------|------|-----|----|

<sup>(1)</sup> In case of vibration above 3 gn on TeSys D Green contactor directly mounted with LRD, it is recommended to mount the devices separately by screws on metal plate.

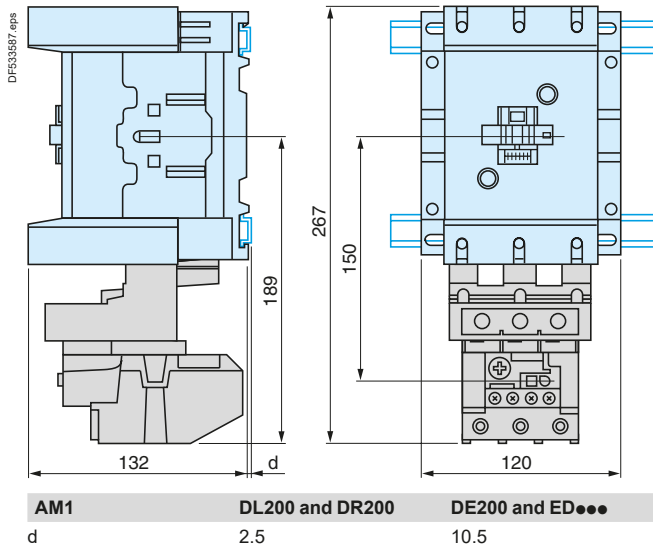
<sup>(2)</sup> LRD380, LRD3806 and LC●D80A●●, LC●D80A6●● available end 2017.

## Overload relays

3-pole thermal overload relays for TeSys D contactors

### LRD4...

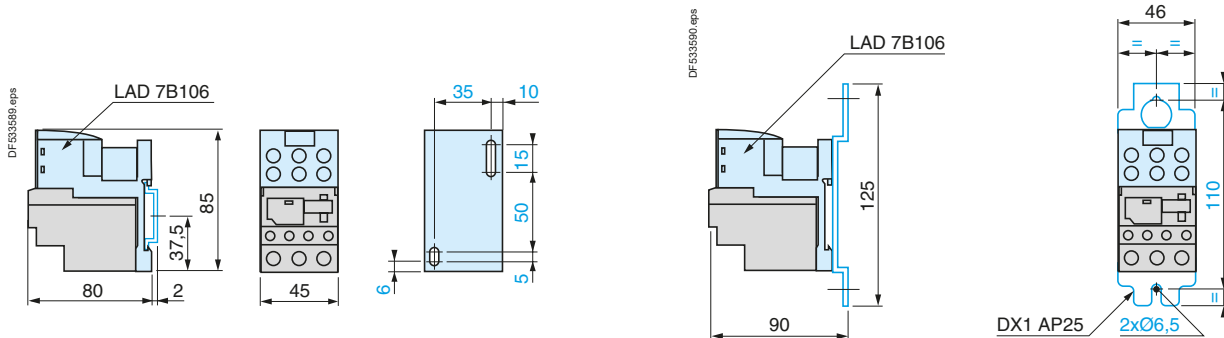
Direct mounting beneath contactors LC1D115 and D150



### LRD01...35

Independent mounting on 50 mm centres or on rail AM1DP200 or DE200

Independent mounting on 110 mm centres



### LRD313 ...380<sup>(2)</sup>

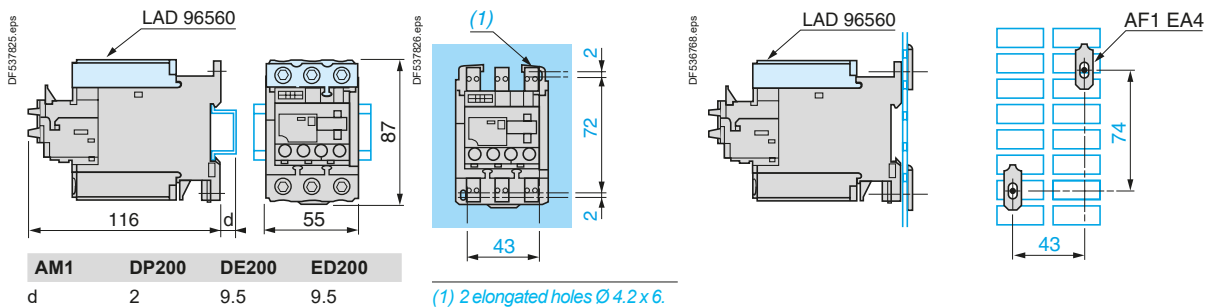
Mounting on rail AM1D200 or ED200

Panel mounting

Mounted on plate AM1P

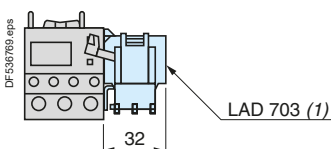
With terminal block LAD96560

Outgoing terminal block not shown



### LRD01...35 and LRD313...380<sup>(2)</sup>

Remote tripping or electrical reset



(1) Can only be mounted on RH side of relay LRD01...35 and LRD313...380.  
(2) LRD380 available end 2017.

Characteristics:  
pages B11/31 to B11/34

References:  
pages B11/4 to B11/7

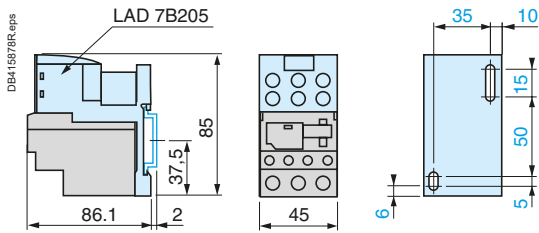
Schemes:  
page B11/37

## Overload relays

3-pole thermal overload relays for TeSys D contactors

### LRD04L...32L

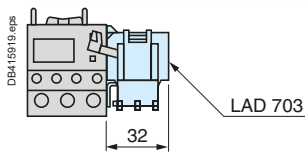
Independent mounting on 50 mm centres or on rail AM1DP200 or DE200



AM1 DP200 DE200

d 2 9.5

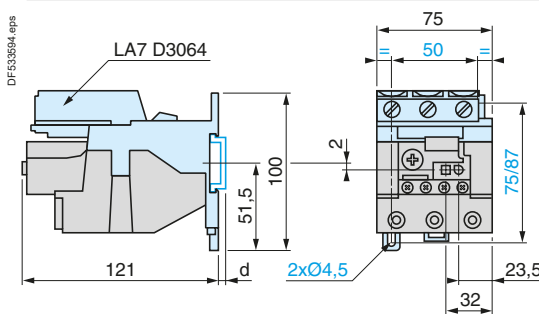
Remote tripping or electrical reset



(1) Can be mounted on RH or LH side of relay LR2D15.

### LRD3... and LR2D35...

Independent mounting on 50 mm centres or on rail AM1DP200 or DE200



AM1 DP200 DE200

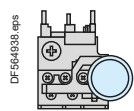
d 2 9.5

### LRD3...

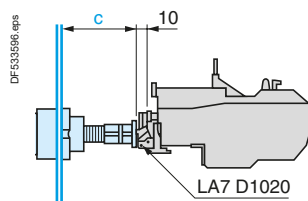
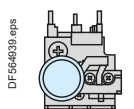
Adapter for door mounted operator

LA7D1020

Stop

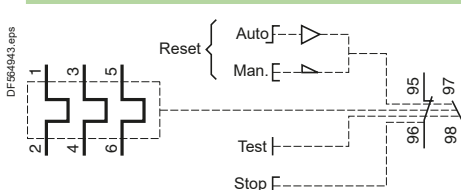


Reset

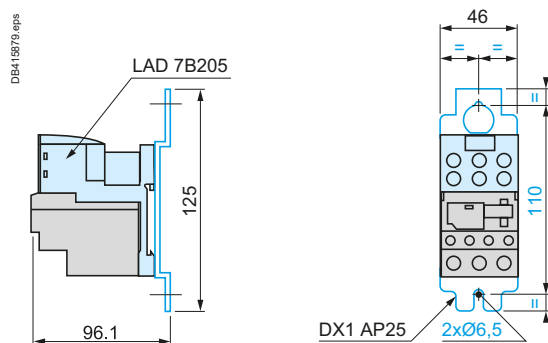


c: adjustable from 17 to 120 mm

### LRD ..., LRD3... and LR2D...

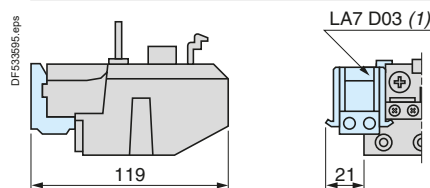


Independent mounting on 110 mm centres



### LRD3..., LR2D35... and LR9 D

Remote tripping or electrical reset



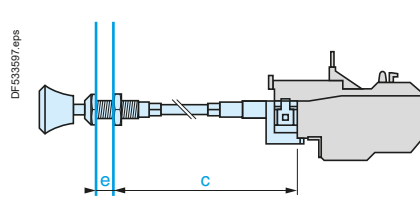
(1) Can be mounted on RH or LH side of relay LRD3..., LR2D35... or LR9 D.

### LRD, LRD313...380 (2), LRD04...32L

"Reset" by flexible cable

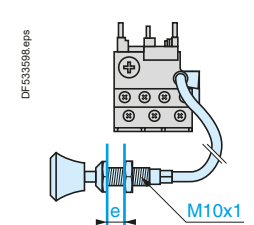
LA7D305 and LAD7305

Mounting with cable straight



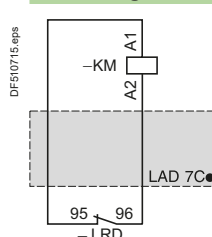
e: up to 20 mm / c: up to 550 mm

Mounting with cable bent



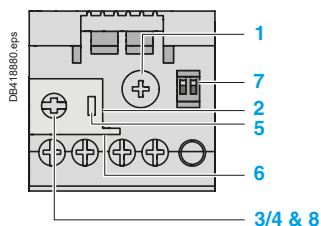
(2) LRD380 available end 2017

### Pre-wiring kit LAD7C1, LAD7C2



## Overload relays

Electronic thermal overload relays for TeSys D contactors



LR9D01...110S

### Description: LR9D01, 02, 08 and 32

These self-powered electronic thermal overload relays are designed for direct mounting to contactors LC1D09 through LC1D38.

LR9D110S self-powered electronic thermal overload relay is designed for separate mounting only.

In addition to the protection provided by the TeSys D thermal overload relays (see page B11/31), they offer the following additional features:

- protection against phase imbalance
- choice of starting class
- protection of unbalanced circuits
- protection of single-phase circuits

- 1 Adjustment dial Ir.
- 2 Test button.
- 3 Stop button.
- 4 Reset button.
- 5 Trip indicator.
- 6 Setting locked by sealing the cover.
- 7 Class 5/10/20/30 dials.
- 8 Reset mode selector.

| Environment                                                              |                                                       |                                                                                                                              |            |
|--------------------------------------------------------------------------|-------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|------------|
| Relay type                                                               |                                                       | LR9D01, 02, 08, 32 and LR9D110S                                                                                              |            |
| Conforming to standards                                                  |                                                       | IEC/EN 60947-4-1, IEC/EN 60947-5-1, UL 60947-4-1, CSA C22.2 n° 60947-4-1, UL 60947-5-1, CSA C22.2 n° 60947-5-1, GB/T 14048.4 |            |
| Product certifications                                                   |                                                       | CCC, CSA, UL, CB certification                                                                                               |            |
| Degree of protection                                                     | Conforming to IEC 60529 and VDE 0106                  | IP 20 on front panel                                                                                                         |            |
| Ambient air temperature around the device<br>(Conforming to IEC 60255-8) | Storage                                               | °C                                                                                                                           | -55 to +80 |
|                                                                          | Normal operation                                      | °C                                                                                                                           | -25 to +70 |
| Maximum operating altitude                                               | Without derating                                      | m                                                                                                                            | 2000       |
| Operating positions without derating                                     | In relation to normal vertical mounting plane         | Any position                                                                                                                 |            |
| Shock resistance                                                         | Permissible acceleration conforming to IEC 60068-2-27 | 15 g (11ms)                                                                                                                  |            |
| Vibration resistance                                                     | Permissible acceleration conforming to IEC 60068-2-6  | 6 g (10-150 Hz)                                                                                                              |            |
| Dielectric strength at 50 Hz                                             | Conforming to IEC 60255-5                             | kV                                                                                                                           | 6          |
| Surge withstand, common mode                                             | Conforming to IEC 61000-4-5                           | kV                                                                                                                           | 2          |
| Resistance to electrostatic discharge                                    | Conforming to IEC 61000-4-2                           | kV                                                                                                                           | 8          |
| Immunity to radiated radio-frequency disturbances                        | Conforming to IEC 61000-4-3 and NF C 46-022           | V/m                                                                                                                          | 10         |
| Immunity to fast transient currents                                      | Conforming to IEC 61000-4-4                           | kV                                                                                                                           | 2          |
| Electromagnetic compatibility                                            | Draft EN 50081-1 and 2, EN 50082-2                    | Meets requirements                                                                                                           |            |

| Electrical characteristics of auxiliary contacts                                                                       |                                             |                       |                         |
|------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|-----------------------|-------------------------|
| Conventional thermal current                                                                                           |                                             | A                     | 5                       |
| Max. sealed consumption of the operating coils of controlled contactors (Occasional operating cycles of contact 95-96) | a.c. supply, AC-15                          | V                     | 24 48 110 220 380 600   |
|                                                                                                                        |                                             | VA                    | 100 200 400 600 600 600 |
|                                                                                                                        | d.c. supply, DC-13                          | V                     | 24 48 110 220 – –       |
|                                                                                                                        |                                             | W                     | 100 100 50 45 – –       |
| Protection against short-circuits                                                                                      | By gG or BS fuses or by circuit breaker GB2 | A                     | 5                       |
| Cabling                                                                                                                | 1 or 2 conductors                           | mm <sup>2</sup> (AWG) | 1 to 2.5 (18 to 14)     |
| Flexible cable without cable end                                                                                       | Tightening torque                           | Nm (lb-in)            | 0.8 (7)                 |



## Overload relays

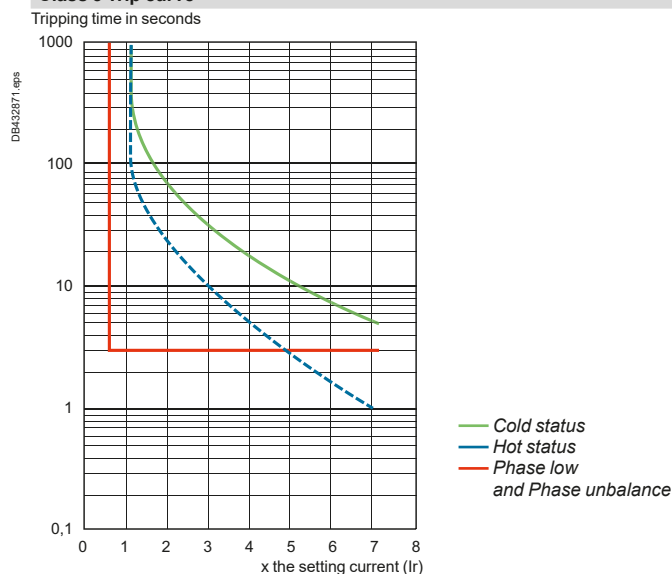
Electronic thermal overload relays for TeSys D contactors

| Electrical characteristics of power circuit |                                                    |            |                   |         |         |          |                     |
|---------------------------------------------|----------------------------------------------------|------------|-------------------|---------|---------|----------|---------------------|
| Relay type                                  |                                                    |            | LR9D01            | LR9D02  | LR9D08  | LR9D32   | LR9D110S            |
| Tripping class                              | Conforming to IEC/EN 60947-4-1                     |            | 5, 10, 20, 30     |         |         |          |                     |
|                                             | Conforming to UL 60947-4-1, CSA C22.2 n° 60947-4-1 |            | 10, 20, 30        |         |         |          |                     |
| Rated insulation voltage (Ui)               | Conforming to IEC 60947-4-1                        | V AC       | 1000              |         |         |          |                     |
| Rated operational voltage (Ue)              | Conforming to IEC 60947-4-1                        | V AC       | 690               |         |         |          |                     |
|                                             | Conforming to UL/CSA                               | V AC       | 600               |         |         |          |                     |
| Rated impulse withstand voltage             |                                                    | kV         | 6                 |         |         |          |                     |
| Frequency limits                            | Of the operating current                           | Hz         | 50...60           |         |         |          |                     |
| Setting range                               |                                                    | A          | 0.1...0.5         | 0.4...2 | 1.6...8 | 6.4...32 | 22...110            |
| Power circuit connections                   | Wire size - 1 or 2 conductors                      | mm² (AWG)  | 1 to 16 (14 to 6) |         |         |          | 4 to 50 (10 to 1/0) |
|                                             | Tightening torque                                  | Nm (lb-in) | 3.1 (28)          |         |         |          | 9 (80)              |

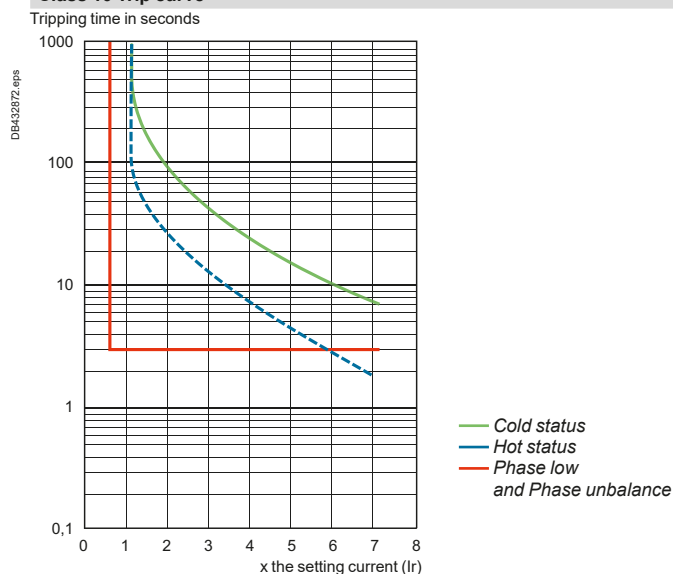
| Operating characteristics      |                             |      |                                         |
|--------------------------------|-----------------------------|------|-----------------------------------------|
| Consumption                    |                             | mW   | < 300                                   |
| Tripping thresholds            | Conforming to IEC 60947-4-1 | A    | 1.25 I <sub>n</sub>                     |
| Sensitivity to phase unbalance | Conforming to IEC 60947-4-1 |      | Phase difference > 40%, tripping in 3 s |
| Current setting ratio          |                             |      | 5:1                                     |
| Automatic reset time           |                             | min. | 1.5...4                                 |

### LR9 D01, 02, 08, 32, LR9110S tripping curves

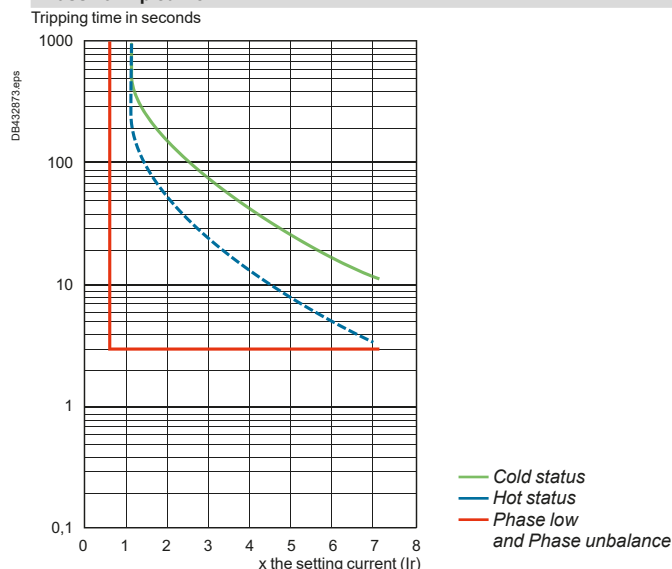
#### Class 5 Trip curve



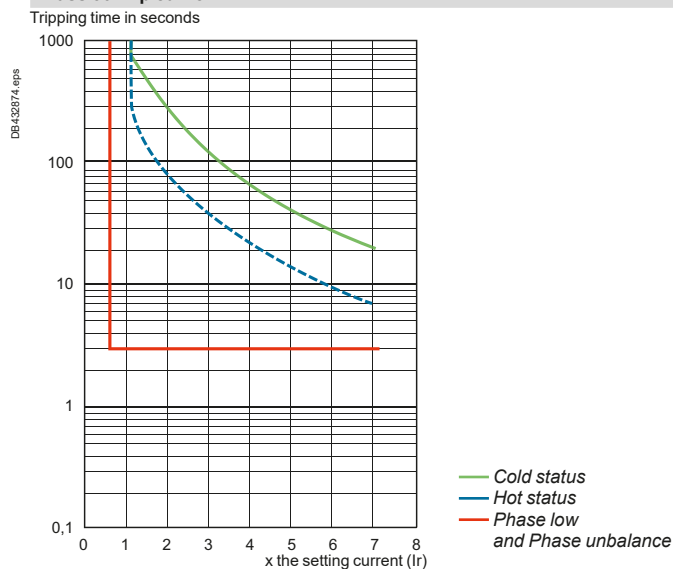
#### Class 10 Trip curve



#### Class 20 Trip curve

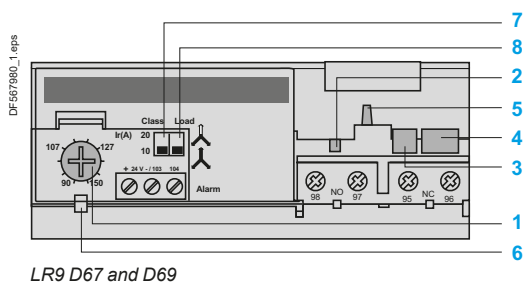
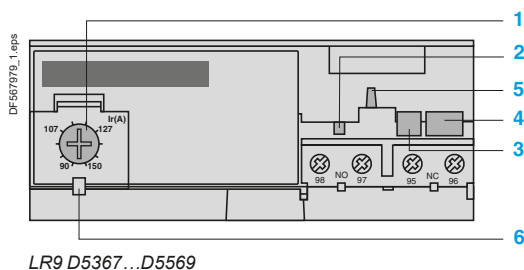


#### Class 30 Trip curve



## Overload relays

Electronic thermal overload relays for TeSys D contactors

**Description: LR9D5367, LR9D5569, LR9D67, LR9D69**

These electronic thermal overload relays are designed for use with contactors LC1D115 and D150.

In addition to the protection provided by TeSys D thermal overload relays (see page B11/31), they offer the following special features:

- protection against phase imbalance
- choice of starting class
- protection of unbalanced circuits
- protection of single-phase circuits
- alarm function to avoid tripping by load shedding.

- 1 Adjustment dial Ir.
- 2 Test button.
- 3 Stop button.
- 4 Reset button.
- 5 Trip indicator.
- 6 Setting locked by sealing the cover.
- 7 Class 10/class 20 selector switch.
- 8 Selector for balanced load  /unbalanced load 

**Environment**

| Relay type                                        |                                                      | LR9D5367, LR9D5569, LR9D67, LR9D69                                                                                           |                            |
|---------------------------------------------------|------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|----------------------------|
| Conforming to standards                           |                                                      | IEC/EN 60947-4-1, IEC/EN 60947-5-1, UL 60947-4-1, CSA C22.2 n° 60947-4-1, UL 60947-5-1, CSA C22.2 n° 60947-5-1, GB/T 14048.4 |                            |
| Product certifications                            |                                                      | UL, CSA, CCC, ABS, BV, DNV-GL                                                                                                |                            |
| Degree of protection                              | Conforming to IEC 60529                              | IP 20 on front panel with protective covers <b>LA9 D11570●</b> or <b>D11560●</b>                                             |                            |
| Climatic withstand                                |                                                      | according to IACS E10                                                                                                        |                            |
| Ambient air temperature around the device         | Storage                                              | °C                                                                                                                           | - 40...+ 85                |
| (Conforming to IEC 60255-8)                       | Normal operation                                     | °C                                                                                                                           | - 20...+ 55 <sup>(1)</sup> |
| Maximum operating altitude                        | Without derating                                     | m                                                                                                                            | 2000                       |
| Operating positions without derating              | In relation to normal vertical mounting plane        |                                                                                                                              | Any position               |
| Shock resistance                                  | Permissible acceleration conforming to IEC60028-2-27 |                                                                                                                              | 13 gn - 11 ms              |
| Vibration resistance                              | Permissible acceleration conforming to IEC 60068-2-6 |                                                                                                                              | 2 gn - 5...300 Hz          |
| Dielectric strength at 50 Hz                      | Conforming to IEC 60947-4-1                          | kV                                                                                                                           | 6                          |
| Surge withstand                                   | Conforming to IEC 61000-4-5                          | kV                                                                                                                           | 6                          |
| Resistance to electrostatic discharge             | Conforming to IEC 61000-4-2                          | kV                                                                                                                           | 8                          |
| Immunity to radiated radio-frequency disturbances | Conforming to IEC 61000-4-3                          | V/m                                                                                                                          | 10                         |
| Immunity to fast transient currents               | Conforming to IEC 61000-4-4                          | kV                                                                                                                           | 2                          |
| Electromagnetic compatibility                     | EN 50081-1 and 2, EN 50082-2                         |                                                                                                                              | Meets requirements         |

**Electrical characteristics of auxiliary contacts**

|                                                                                                                        |                                                    |     |                     |     |     |     |     |     |
|------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|-----|---------------------|-----|-----|-----|-----|-----|
| Conventional thermal current                                                                                           |                                                    | A   | 5                   |     |     |     |     |     |
| Max. sealed consumption of the operating coils of controlled contactors (Occasional operating cycles of contact 95-96) | a.c. supply                                        | V   | 24                  | 48  | 110 | 220 | 380 | 600 |
|                                                                                                                        |                                                    | VA  | 100                 | 200 | 400 | 600 | 600 | 600 |
|                                                                                                                        | d.c. supply                                        | V   | 24                  | 48  | 110 | 220 | 440 | –   |
|                                                                                                                        |                                                    | W   | 100                 | 100 | 50  | 45  | 25  | –   |
| Protection against short-circuits                                                                                      | By gG or BS fuses or by circuit breaker <b>GB2</b> | A   | 5                   |     |     |     |     |     |
| Cabling                                                                                                                | 1 or 2 conductors                                  | mm² | Minimum c.s.a.: 1   |     |     |     |     |     |
| Flexible cable without cable end                                                                                       |                                                    |     | Maximum c.s.a.: 2.5 |     |     |     |     |     |
|                                                                                                                        | Tightening torque                                  | Nm  | 1.2                 |     |     |     |     |     |

<sup>(1)</sup> For operating temperatures up to 70 °C, please consult your Regional Sales Office.

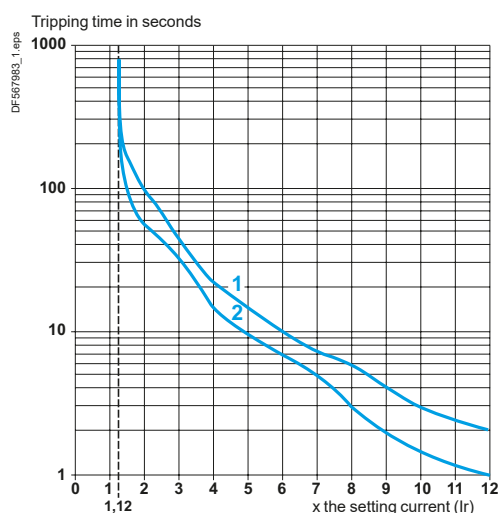
# Overload relays

Electronic thermal overload relays for TeSys D contactors

| Electrical characteristics of power circuit |                                                                      |                                    |                                                     |
|---------------------------------------------|----------------------------------------------------------------------|------------------------------------|-----------------------------------------------------|
| Relay type                                  |                                                                      | LR9D5367, LR9D5569, LR9D67, LR9D69 |                                                     |
| Tripping class                              | Conforming to IEC/EN 60947-4-1, UL 60947-4-1, CSA C22.2 n° 60947-4-1 |                                    | 10 or 20                                            |
| Rated insulation voltage (Ui)               | Conforming to IEC 60947-4-1                                          | V                                  | 1000                                                |
|                                             | Conforming to UL, CSA                                                | V                                  | 600                                                 |
| Rated impulse withstand voltage (Uimp)      |                                                                      | kV                                 | 8                                                   |
| Frequency limits                            | Of the operating current                                             | Hz                                 | 50...60 <sup>(1)</sup>                              |
| Setting range                               | Depending on model                                                   | A                                  | 60...150                                            |
| Power circuit connections                   | Width of terminal lug                                                | mm                                 | 20                                                  |
|                                             | Clamping screw                                                       |                                    | M8                                                  |
|                                             | Tightening torque                                                    | N.m                                | 18                                                  |
| Operating characteristics                   |                                                                      |                                    |                                                     |
| Temperature compensation                    |                                                                      | °C                                 | - 20...+70                                          |
| Tripping thresholds                         | Conforming to IEC 60947-4-1                                          |                                    |                                                     |
|                                             | Alarm                                                                | A                                  | 1.05 ±0.06 In                                       |
|                                             | Trip                                                                 | A                                  | 1.12 ±0.06 In                                       |
| Sensitivity to phase failure                | Conforming to IEC 60947-4-1                                          |                                    | Tripping in 4 s ±20 % in the event of phase failure |
| Alarm circuit characteristics               |                                                                      |                                    |                                                     |
| Rated supply voltage                        | d.c. supply                                                          | V                                  | 24                                                  |
| Supply voltage limits                       |                                                                      | V                                  | 17...32                                             |
| Current consumption                         | No-load                                                              | mA                                 | ≤ 5                                                 |
| Switching capacity                          |                                                                      | mA                                 | 0...150                                             |
| Protection                                  | Short-circuit and overload                                           |                                    | Self protected                                      |
| Voltage drop                                | Closed state                                                         | V                                  | ≤ 2.5                                               |
| Cabling                                     | Flexible cable without cable end                                     | mm²                                | 0.5...1.5                                           |
| Tightening torque                           |                                                                      | N.m                                | 0.45                                                |

<sup>(1)</sup> For other frequencies and for applications involving the use of these overload relays with soft starters or variable speed drives, please consult your Regional Sales Office.

## LR9D5367, LR9D5569, LR9D67, LR9D69 tripping curves



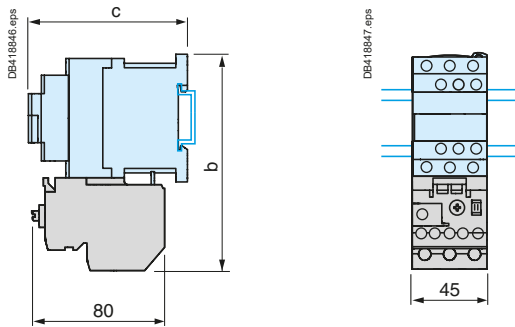
Average operating time related to multiples of the setting current

- 1 Cold state curve
- 2 Hot state curve

## Overload relays

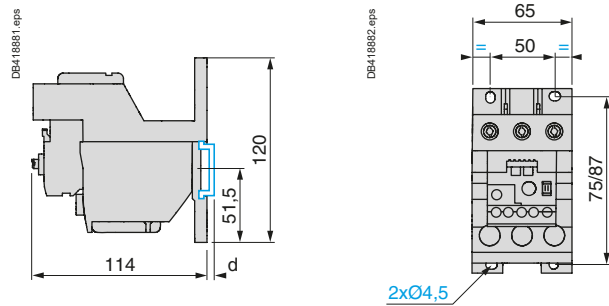
Electronic thermal overload relays for TeSys D contactors

### LR9D01, 02, 08, 32

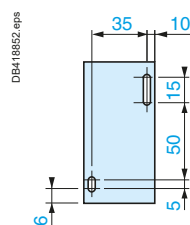
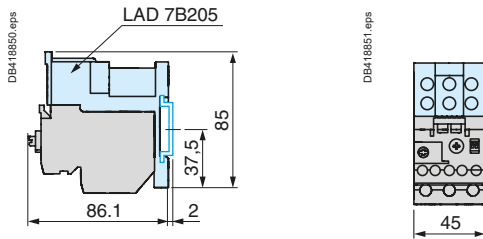


| LC1 | D09...D18                 | D25...D38 |
|-----|---------------------------|-----------|
| b   | 130                       | 140       |
| c   | See pages B8/65 and B8/66 |           |

### LR9D110S

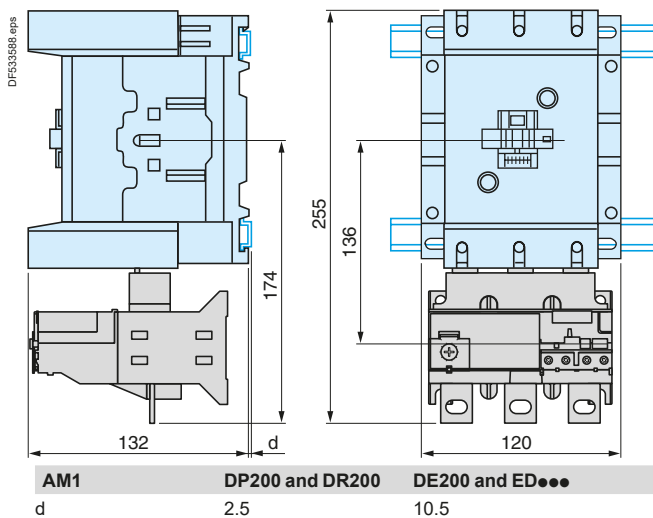


### LR9D01...32



### LR9D53●●, LR9D55●●, LR9D67, LR9D69

Direct mounting beneath contactors LC 1D115 and D150

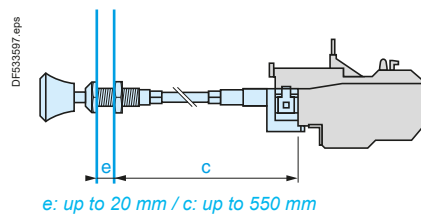


### LR9D

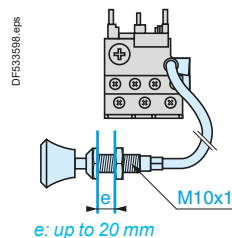
"Reset" by flexible cable

LA7D305 and LAD7305

Mounting with cable straight



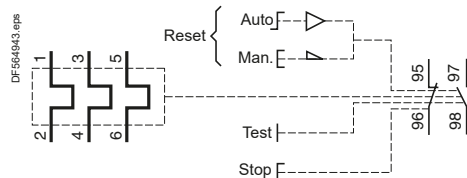
Mounting with cable bent



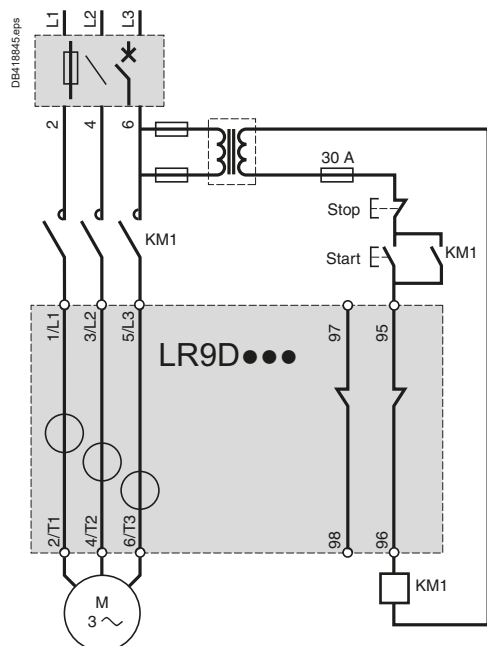
## Overload relays

Electronic thermal overload relays for TeSys D contactors

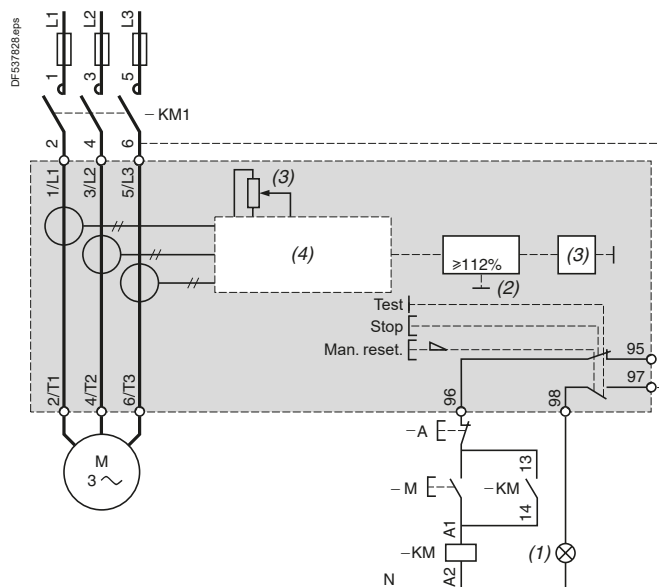
### LR9D01, 02, 08, 32, LR9 D110S



### LR9D01, 02, 08, 32, LR9 D110S



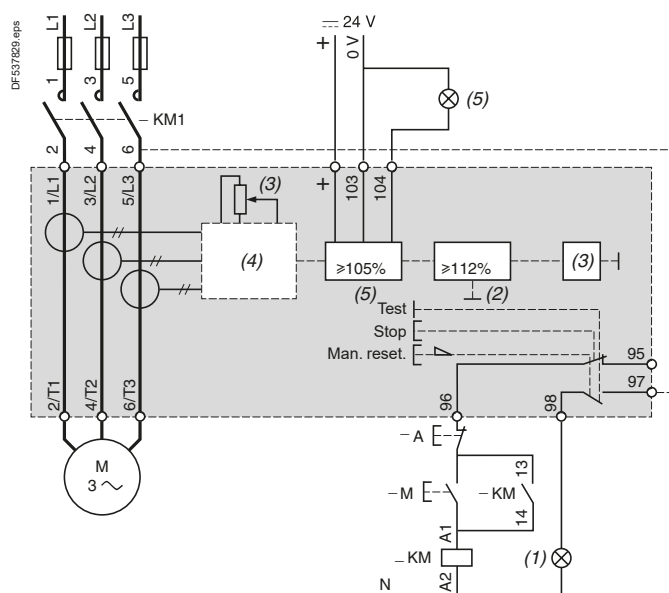
### LR9D5...



(1) Tripped.  
(2) Overload.

(3) Setting current.  
(4) Specialised circuit.

### LR9 D67 and LR9 D69



(1) Tripped.  
(2) Overload.  
(3) Setting current.  
(4) Specialised circuit.  
(5) Alarm.

## Overload relays

Electronic thermal overload relays for TeSys F contactors

### Presentation

TeSys LR9F electronic protection relays are especially suited to the operating conditions of motors.

They provide protection against:

- thermal overload of 3-phase or single-phase balanced or unbalanced circuits;
- phase failure and large phase unbalance,
- protracted starting times,
- prolonged stalled rotor condition.

LR9F electronic protection relays are mounted directly below an LC1 F type contactor. They cover a range from 30 to 630 A, in eight ratings.

The settings can be locked by sealing the transparent protective cover.

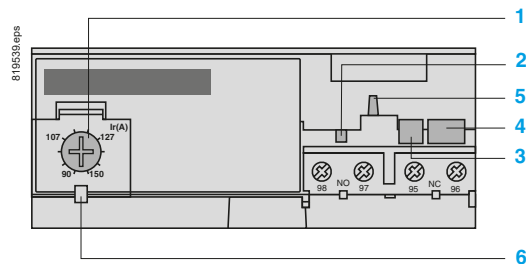
A reset button is mounted on the front of the relay.

Two versions are available:

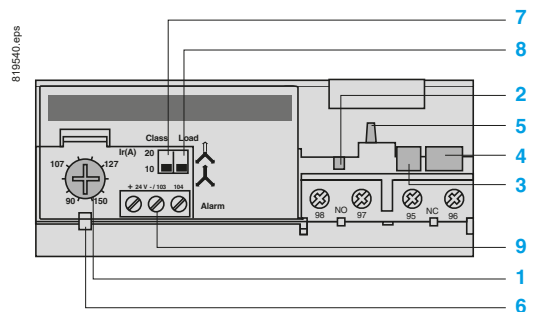
- simplified version: class 10: LR9F●3●●, class 20: LR9F●5●●,
- complete version: class 10, 10 A or class 20, selectable, conforming to EN 60947-4-1: LR9F●●●.

This latter version includes an alarm function which makes it possible to forestall tripping by load shedding.

### Simplified version: class 10 or 20



### Complete version: class 10, 10 A or class 20, selectable, and alarm circuit



- 1 Ir adjustment dial
- 2 Test button
- 3 Stop button
- 4 Reset button
- 5 Trip indicator
- 6 Setting locked by sealing the cover
- 7 Class 10/class 20 selector switch
- 8 Selector switch for balanced load / unbalanced load
- 9 Alarm circuit

## Overload relays

Electronic thermal overload relays for TeSys F contactors

| Environment                                                           |                                                      |     |                                                                                                                              |
|-----------------------------------------------------------------------|------------------------------------------------------|-----|------------------------------------------------------------------------------------------------------------------------------|
| Conforming to standards                                               |                                                      |     | IEC/EN 60947-4-1, IEC/EN 60947-5-1, UL 60947-4-1, CSA C22.2 n° 60947-4-1, UL 60947-5-1, CSA C22.2 n° 60947-5-1, GB/T 14048.4 |
| Product certifications                                                |                                                      |     | UL, CSA, CCC, ABS, BV, DNV-GL                                                                                                |
| Degree of protection                                                  | Conforming to VDE 0106                               |     | IP 20                                                                                                                        |
|                                                                       | Conforming to IEC 60529                              |     | IP 20 on front of relay with accessories <b>LA9F103</b> or <b>LA7F70●</b> , see page B11/14                                  |
| Climatic withstand                                                    |                                                      |     | according to IACS E10                                                                                                        |
| Ambient air temperature around the device (conforming to IEC 60255-8) | Storage                                              | °C  | -40...+85                                                                                                                    |
|                                                                       | Normal operation                                     | °C  | -20...+55 <sup>(1)</sup>                                                                                                     |
| Maximum operating altitude                                            | Without derating                                     | m   | 2000                                                                                                                         |
| Operating positions without derating                                  | In relation to normal vertical mounting plane        |     | Any position                                                                                                                 |
| Shock resistance                                                      | Permissible acceleration conforming to IEC 60068-2-7 |     | 13 gn - 11 ms                                                                                                                |
| Vibration resistance                                                  | Permissible acceleration conforming to IEC 60068-2-6 |     | 2 gn - 5 to 300 Hz                                                                                                           |
| Dielectric strength at 50 Hz                                          | Conforming to IEC 60947-4-1                          | kV  | 6                                                                                                                            |
| Surge withstand                                                       | Conforming to IEC 61000-4-5                          | kV  | 4                                                                                                                            |
| Resistance to electrostatic discharge                                 | Conforming to IEC 61000-4-2                          | kV  | 8 (in air)<br>6 (in indirect mode)                                                                                           |
| Resistance to radiated radio-frequency disturbance                    | Conforming to IEC 61000-4-3                          | V/m | 10                                                                                                                           |
| Resistance to fast transient currents                                 | Conforming to IEC 61000-4-4                          | kV  | 2                                                                                                                            |
| Electromagnetic compatibility                                         | EN 50081-1 and 2, EN 50082-2                         |     | Conforming                                                                                                                   |

<sup>(1)</sup> For operating temperatures up to 70 °C, please consult your Regional Sales Office.

# Overload relays

Electronic thermal overload relays for TeSys F contactors

| Electrical characteristics of power circuit                                                                             |                                  |              |     |                                                                                          |     |                                       |                                                  |                 |                          |            |
|-------------------------------------------------------------------------------------------------------------------------|----------------------------------|--------------|-----|------------------------------------------------------------------------------------------|-----|---------------------------------------|--------------------------------------------------|-----------------|--------------------------|------------|
| Relay type                                                                                                              |                                  |              | LR9 | F5●57, F57                                                                               |     | F5●63, F63<br>F5●67,<br>F67F5●69, F69 |                                                  | F5●71, F71      | F7●75, F75<br>F7●79, F79 | F7●81, F81 |
| Rated insulation voltage (Ui) Conforming to IEC 60947-4-1                                                               |                                  |              | V   | 1000                                                                                     |     |                                       |                                                  |                 |                          |            |
| Rated impulse withstand voltage (Uimp) Conforming to IEC 60947-1                                                        |                                  |              | kV  | 8                                                                                        |     |                                       |                                                  |                 |                          |            |
| Rated operational current (Ie)                                                                                          |                                  |              | A   | 30 to 630                                                                                |     |                                       |                                                  |                 |                          |            |
| Short-circuit protection and coordination                                                                               |                                  |              |     | See pages: A6/11, A6/12, A6/15 and A6/16                                                 |     |                                       |                                                  |                 |                          |            |
| Frequency limits Of the operating current                                                                               |                                  |              | Hz  | 50...60. For other frequencies, please consult your Regional Sales Office <sup>(1)</sup> |     |                                       |                                                  |                 |                          |            |
| Power circuit connections                                                                                               | Width of terminal lug            |              | mm  | 20                                                                                       | 25  | 25                                    | 30 LR9F7●75 and LR9F75<br>40 LR9F7●79 and LR9F79 |                 | 40                       |            |
|                                                                                                                         | Clamping screw                   |              |     | M6                                                                                       | M8  | M10                                   | M10                                              |                 | M12                      |            |
|                                                                                                                         | Tightening torque                |              | N.m | 10                                                                                       | 18  | 35                                    | 35                                               |                 | 58                       |            |
| Auxiliary contact electrical characteristics                                                                            |                                  |              |     |                                                                                          |     |                                       |                                                  |                 |                          |            |
| Conventional thermal current                                                                                            |                                  |              | A   | 5                                                                                        |     |                                       |                                                  |                 |                          |            |
| Short-circuit protection By gG or BS fuses or by circuit-breaker GB2 CD10                                               |                                  |              | A   | 5                                                                                        |     |                                       |                                                  |                 |                          |            |
| Control circuit connections                                                                                             | Flexible cable with cable end    | 1 conductor  | mm² | Min.<br>1 x 0.75                                                                         |     |                                       |                                                  | Max.<br>1 x 2.5 |                          |            |
|                                                                                                                         |                                  | 2 conductors | mm² | 2 x 1                                                                                    |     |                                       |                                                  | 2 x 1.5         |                          |            |
|                                                                                                                         |                                  |              |     |                                                                                          |     |                                       |                                                  |                 |                          |            |
|                                                                                                                         | Flexible cable without cable end | 1 conductor  | mm² | 1 x 0.75                                                                                 |     |                                       |                                                  | 1 x 4           |                          |            |
|                                                                                                                         |                                  | 2 conductors | mm² | 2 x 1                                                                                    |     |                                       |                                                  | 2 x 2.5         |                          |            |
|                                                                                                                         | Solid cable                      | 1 conductor  | mm² | 1 x 0.75                                                                                 |     |                                       |                                                  | 1 x 2.5         |                          |            |
|                                                                                                                         |                                  | 2 conductors | mm² | 2 x 1                                                                                    |     |                                       |                                                  | —               |                          |            |
| Tightening torque                                                                                                       |                                  |              | N.m | 1.2                                                                                      |     |                                       |                                                  |                 |                          |            |
| Maximum sealed current consumption of the coils of associated contactors (occasional operating cycles of contact 95-96) | a.c. supply                      | V            | 24  | 48                                                                                       | 110 | 220                                   | 380                                              | 600             |                          |            |
|                                                                                                                         |                                  | VA           | 100 | 200                                                                                      | 400 | 600                                   | 600                                              | 600             |                          |            |
|                                                                                                                         | d.c. supply                      | V            | 24  | 48                                                                                       | 110 | 220                                   | 440                                              | —               |                          |            |
|                                                                                                                         |                                  | W            | 100 | 100                                                                                      | 50  | 45                                    | 25                                               | —               |                          |            |

<sup>(1)</sup> For applications involving the use of these overload relays with soft starters or variable speed drives, please consult your Regional Sales Office.



## Overload relays

Electronic thermal overload relays for TeSys F contactors

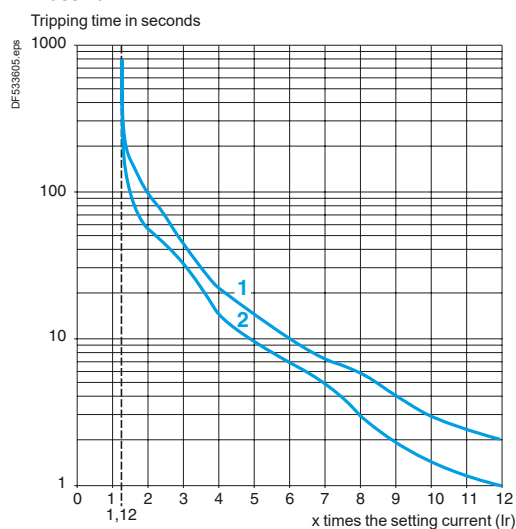
| Operating characteristics          |                             |          |   |                                                                   |
|------------------------------------|-----------------------------|----------|---|-------------------------------------------------------------------|
| Tripping class                     | Conforming to IEC 60947-4-1 |          |   | 10 and 20                                                         |
| Temperature compensation           |                             | °C       |   | -20...+70                                                         |
| Reset                              |                             |          |   | Manual on front of relay                                          |
| Fault indication                   |                             |          |   | On front of relay                                                 |
| Test function                      |                             |          |   | On front of relay                                                 |
| Stop function                      |                             |          |   | Actuation of N/C contact, without affecting N/O contact           |
| Tripping thresholds                | Conforming to IEC 60947-4-1 | Alarm    | A | $1.05 \pm 0.06 I_n$                                               |
|                                    |                             | Tripping | A | $1.12 \pm 0.06 I_n$                                               |
| Sensitivity to phase failure       | Conforming to IEC 60947-4-1 |          |   | Tripping in $4 \text{ s} \pm 20 \%$ in the event of phase failure |
| Adjustment (nominal motor current) |                             |          |   | Setting dial on front of relay                                    |
| Security sealing                   |                             |          |   | Yes                                                               |

| Alarm circuit characteristics |                                  |                 |  |                |
|-------------------------------|----------------------------------|-----------------|--|----------------|
| Rated supply voltage          | d.c. supply                      | V               |  | 24             |
| Supply voltage limits         |                                  | V               |  | 17...32        |
| Current consumption           | No-load                          | mA              |  | $\leq 5$       |
| Switching current             |                                  | mA              |  | 0...150        |
| Protection                    | Short-circuit and overload       |                 |  | Auto-protected |
| Voltage drop                  | Closed state                     | V               |  | $\leq 2.5$     |
| Connection                    | Flexible cable without cable end | mm <sup>2</sup> |  | 0.5...1.5      |
| Tightening torque             |                                  | N.m             |  | 0.45           |

### LR9F tripping curve

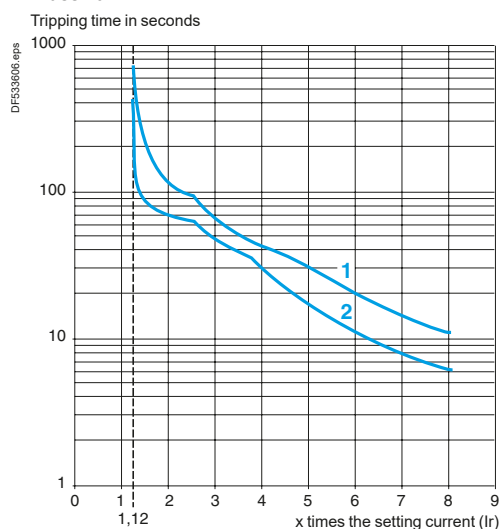
Average operating times depending on multiples of the setting current

#### Class 10



- 1 Cold state curve
- 2 Hot state curve

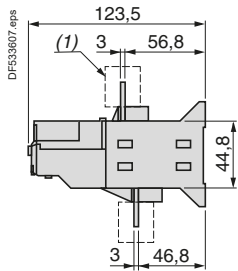
#### Class 20



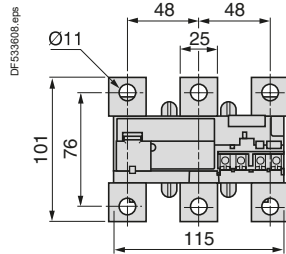
## Overload relays

Electronic thermal overload relays for TeSys F contactors

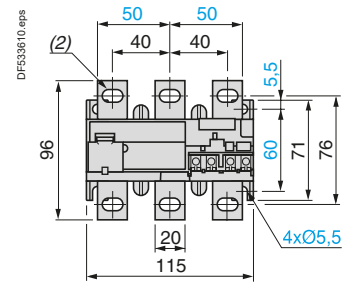
Common side view



LR9F57, F71

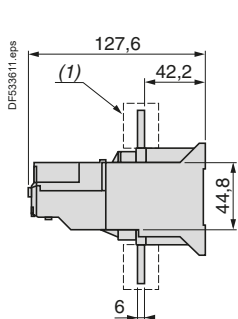


LR9F57, F563, F567, LR9F569, F57, F63, F67, F69



(1) Terminal shroud LA9F70

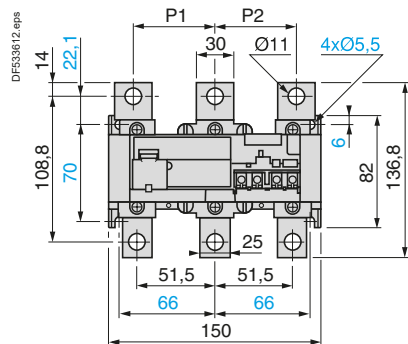
Common side view



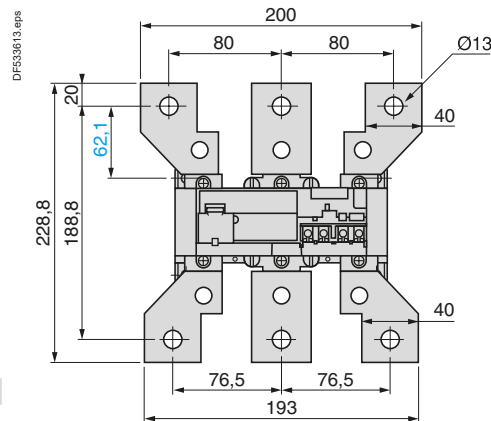
(1) Terminal shroud LA9F70

(2) 6.5 x 13.5 for LR9F57 and F57. 8.5 x 13.5 for LR9F563, F567, F569, F63, F67, F69

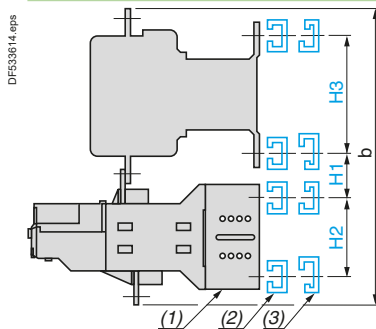
LR9F75, F779, F781, LR9F75, F79, F81



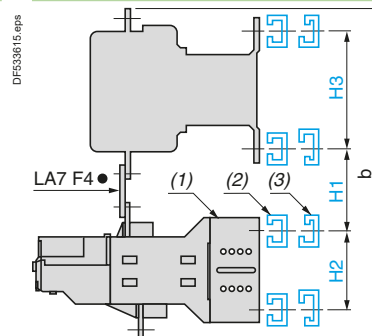
LR9F781 (for mounting beneath LC1 F630 and F800), LR9F81



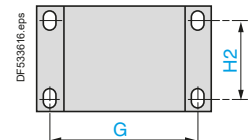
Direct mounting beneath contactor LC1 F



Mounting beneath contactors: reversing LC2 F or star-delta LC3 F



Mounting plate for LR9F



| LA7  | G   |
|------|-----|
| F901 | 145 |
| F902 | 190 |

| Contactors LC1 | With LR9 relays                           | b   | H1  | H2 | H3  |
|----------------|-------------------------------------------|-----|-----|----|-----|
| F115           | F57, F563, F567, F569, F57, F63, F67, F69 | 240 | 30  | 50 | 120 |
| F150           | F57, F563, F567, F569, F57, F63, F67, F69 | 246 | 30  | 50 | 120 |
| F185           | F57, F563, F567, F569, F57, F63, F67, F69 | 250 | 30  | 50 | 120 |
| F225           | F57, F71, F71                             | 273 | 40  | 50 | 120 |
| F265           | F775, F779, F75, F79                      | 308 | 50  | 58 | 120 |
| F265           | F57, F71, F71                             | 279 | 40  | 50 | 120 |
| F265           | F775, F779, F75, F79                      | 314 | 60  | 58 | 120 |
| F330           | F775, F779, F75, F79                      | 317 | 60  | 58 | 120 |
| F400           | F775, F779, F781, F75, F79, F81           | 317 | 60  | 58 | 180 |
| F500           | F775, F779, F781, F75, F79, F81           | 346 | 70  | 58 | 180 |
| F630, F800     | F781, F81                                 | 510 | 110 | 58 | 180 |

(1) Relay mounting plate LA7F90, see page B11/14.

(2) AM1 EC or AM1DF for LC1 F115 to F630 and LC1 F800.

| Contactors LC1 | With LR9 relays                           | b   | H1  | H2 | H3  |
|----------------|-------------------------------------------|-----|-----|----|-----|
| F115           | F57, F563, F567, F569, F57, F63, F67, F69 | 279 | 60  | 50 | 120 |
| F150           | F57, F563, F567, F569, F57, F63, F67, F69 | 283 | 60  | 50 | 120 |
| F185           | F57, F563, F567, F569, F57, F63, F67, F69 | 285 | 60  | 50 | 120 |
| F225           | F57, F71, F71                             | 360 | 100 | 58 | 120 |
| F265           | F775, F779, F75, F79                      | 332 | 90  | 50 | 120 |
| F265           | F775, F779, F75, F79                      | 363 | 100 | 58 | 120 |
| F330           | F775, F779, F75, F79                      | 364 | 100 | 58 | 120 |
| F400           | F775, F779, F781, F75, F79, F81           | 364 | 100 | 58 | 180 |
| F500           | F775, F779, F781, F75, F79, F81           | 390 | 110 | 58 | 180 |
| F630, F800     | F781, F81                                 | 509 | 120 | 58 | 180 |

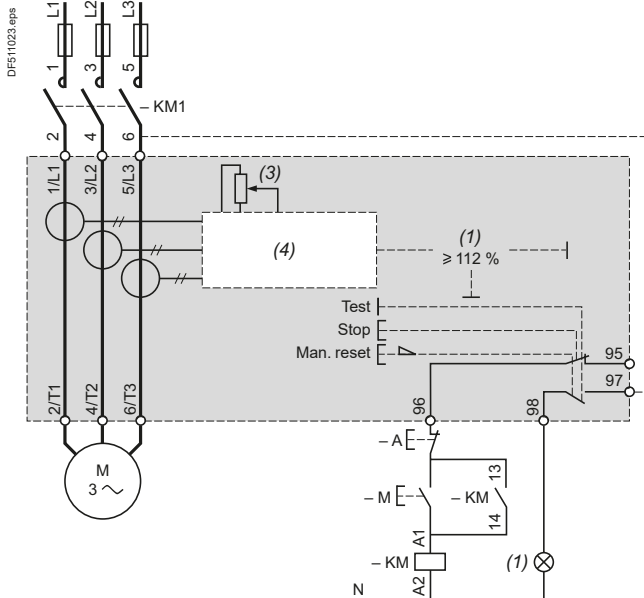
(3) DZ5 MB for LC1 F115 to F400.

## Overload relays

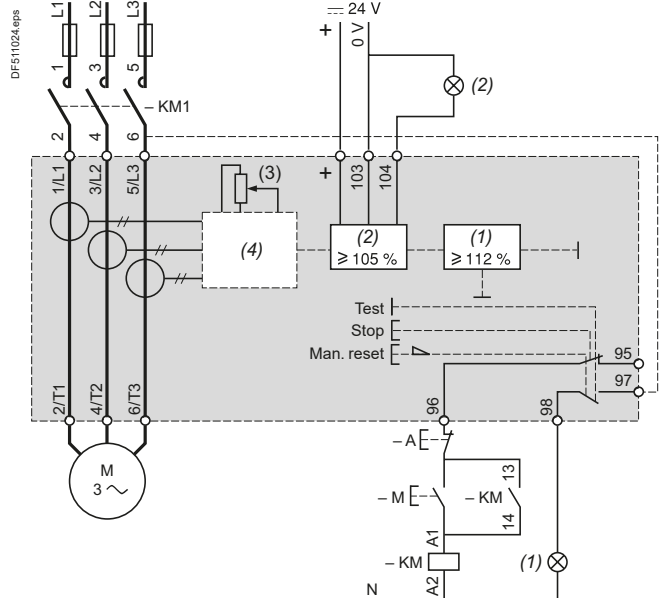
Electronic thermal overload relays for TeSys F contactors

### Schemes

#### LR9F5...F7...F81



#### LR9F57...F81 (with alarm)

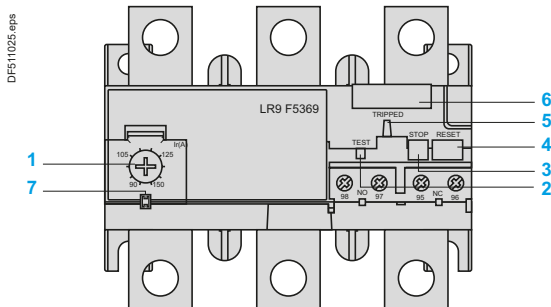


- (1) Tripped on thermal overload.
- (2) Overheating alarm.
- (3) Setting current.
- (4) Specialised circuit.

### Setting-up the special functions of TeSys LR9F thermal overload relays

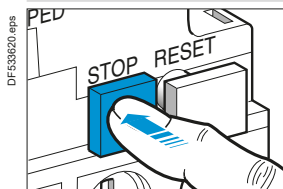
#### Setting the relay

- Lift the transparent cover 7 to gain access to the various settings.
- Adjustment is achieved by turning dial 1 which is graduated directly in Amperes.
- The setting can be locked by sealing the cover 7.



#### "Stop" function 3

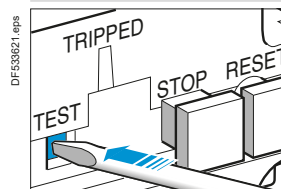
##### Stop



- The "Stop" function is obtained by pressing the red "STOP" button 3.
- Pressing the Test button:
  - ☐ actuates the N/C contact,
  - ☐ has no effect on the N/O contact.
- The "STOP" button can be locked by fitting a "U" clip (reference: LA7D901).

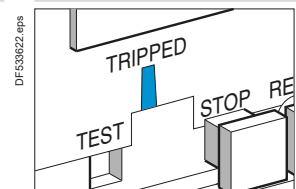
#### "Test" function 2

##### Test



- The "Test" function is obtained by pressing the red "TEST" button 2 with a screwdriver.
- Operation of the "TEST" button simulates tripping of the relay and:
  - ☐ actuates both the N/O and N/C contacts,
  - ☐ actuates the trip indicator 5.

##### Trip indicator



## Overload relays

### Single-pole magnetic over current relays

#### Presentation

The RM1 XA electromagnetic relay detects over current peaks in excess of the maximum permissible current value. It is designed for the protection of circuits which are not subject to current peaks (starters, resistors) or for controlling starting peaks on slip ring motors.

It trips instantaneously and is not suitable for frequent operation (12 operating cycles per hour). It can withstand a continuous current equivalent to 1.25 times the minimum setting current.

#### Environment characteristics

|                                           |    |                                                        |
|-------------------------------------------|----|--------------------------------------------------------|
| Conforming to standards                   |    | IEC/EN 60947-4-1                                       |
| Ambient air temperature around the device | °C | Storage: - 60...+ 70<br>Operation: - 40...+ 60         |
| Maximum operating altitude                | m  | 2000                                                   |
| Operating position                        |    | ± 15° in relation to normal vertical mounting position |

#### Electrical characteristics of power circuit

|                                                   |    |              |
|---------------------------------------------------|----|--------------|
| Maximum rated operational voltage                 | V  | ~ or --- 600 |
| Frequency limits of the rated operational current | Hz | 0...60       |

#### Electrical characteristics of auxiliary contacts

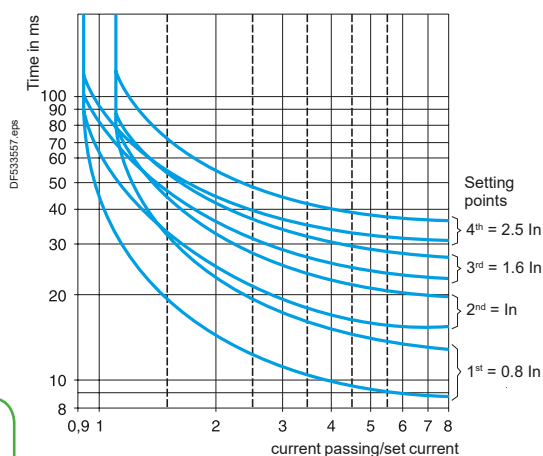
|                                           |             |                      |    |      |        |        |        |     |
|-------------------------------------------|-------------|----------------------|----|------|--------|--------|--------|-----|
| Conventional thermal current              |             |                      | A  | 10   |        |        |        |     |
| Occasional making and breaking capacities | a.c. supply | Voltage              | V  | 48   | 110    | 220    | 380    | 600 |
|                                           |             | Power <sup>(1)</sup> | VA | 4000 | 12 000 | 17 000 | 22 000 | –   |
|                                           | d.c. supply | Voltage              | V  | 48   | 110    | 220    | 440    | 600 |
|                                           |             | Power <sup>(2)</sup> | W  | 240  | 200    | 190    | 180    | 180 |

<sup>(1)</sup> Circuit such as the electromagnet of a contactor -  $\cos \varphi$  inrush: 0.7 and  $\cos \varphi$  sealed: 0.4.

<sup>(2)</sup> Circuit such as an electromagnet without economy resistor ; time constant varying from 20 ms for 5 W to 200 ms for 100 W or more.

#### Operating times

Operating times: because of the numerous applications for RM1 XA over current relays, it is not possible to give precise operating times. The curves shown are therefore purely indicative.



## Overload relays

Single-pole magnetic over current relays

### Dimensions

RM1XA●●●,  
RM1XA●●●1

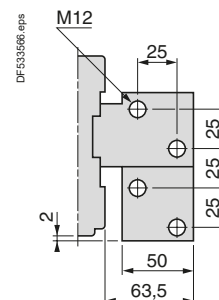
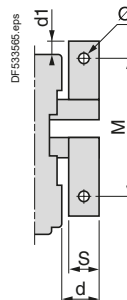
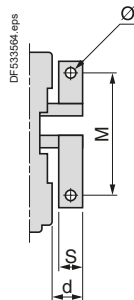
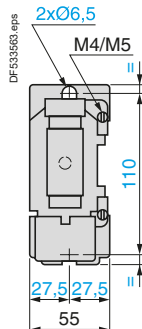
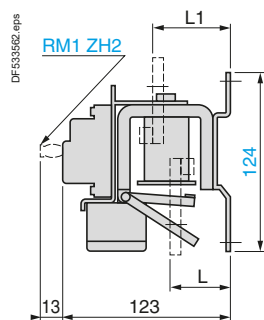
RM1XA001...XA040  
RM1XA0011...XA0401

RM1XA063, XA100  
and XA315  
RM1XA0631, XA1001  
and XA3151

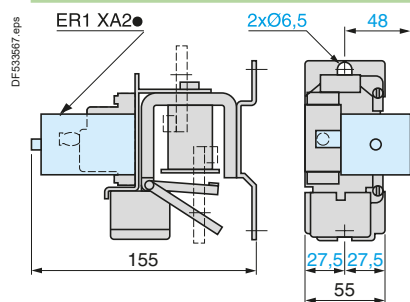
RM1XA160, XA200,  
and XA500  
RM1XA1601, XA2001,  
and XA5001

RM1XA101,  
RM1XA1011

Common side view



RM1XA●●●1 with electrical reset ER1XA2●

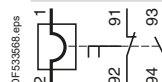


| RM1    | d    | d1  | M  | L  | L1 | S  | Ø   |
|--------|------|-----|----|----|----|----|-----|
| XA 063 | 20.5 | —   | 83 | 25 | 40 | 15 | M6  |
| XA 100 | 20.5 | —   | 87 | 25 | 40 | 20 | M8  |
| XA 160 | 27.5 | 5.5 | 94 | 25 | 40 | 25 | M8  |
| XA 200 | 27.5 | 5.5 | 94 | 25 | 40 | 25 | M8  |
| XA 315 | 35.5 | —   | 74 | 44 | 55 | 30 | M10 |
| XA 500 | 40.5 | 7   | 84 | 44 | 55 | 40 | M10 |
| XA 101 | —    | —   | —  | 37 | 64 | —  | —   |

### Schemes

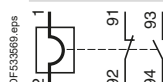
RM1XA●●●1

Latching



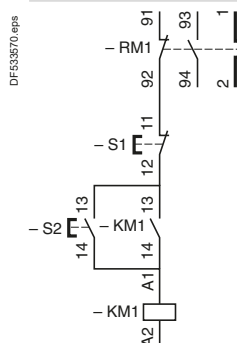
RM1XA●●●

Non-latching

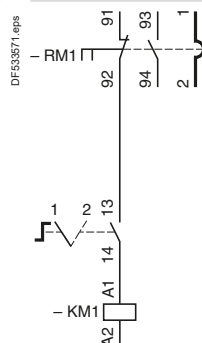


RM1XA

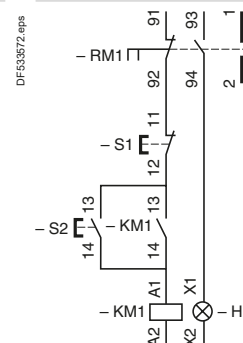
3-wire control (without  
mechanical latching)



2-wire control (with  
mechanical latching)



3-wire control  
(with "trip" signal)



## Overload relays

Thermistor protection units for use with PTC thermistor probes <sup>(1)</sup>

### Application

LT3S thermistor protection units continuously monitor the temperature of the machines to be protected (motors, generators, etc.) by means of PTC thermistor probes embedded in the machine windings.

If the nominal operating temperature of the probes is reached, they convert the rapid increase in resistance into a switching function which can be used to switch off the machine or signal a fault (see paragraph relating to thermistor probes below).

Accidental breaks in the supply circuits of the thermistors are also detected.

### Electromagnetic compatibility

Conforming to "Electromagnetic compatibility" directive.

Conforming to standard IEC/EN 61000-6-2.

|                                                                        |                |
|------------------------------------------------------------------------|----------------|
| Resistance to electrostatic discharge (conforming to IEC 61000-4-2)    | <b>Level 3</b> |
| Resistance to fast transients (conforming to IEC 61000-4-4)            | <b>Level 3</b> |
| Susceptibility to electromagnetic fields (conforming to IEC 61000-4-3) | <b>Level 3</b> |
| Surge resistance 1.2/50 - 8/20 (conforming to IEC 61000-4.5)           | <b>Level 4</b> |
| Immunity to microbreaks and voltage drops (IEC 61000-4-11)             |                |
| Suitable for use with variable speed controllers                       |                |

### Thermistor probes

Range of most commonly used PTC thermistor probes:

from 90 to 160 °C, in steps of 10 °C.

Curve  $R = f(\theta)$ , characteristic of a PTC thermistor probe, is defined by standard IEC 60947-8.

The choice of PTC thermistor probe to be incorporated in the motor winding depends on the insulation class, the type of motor and the most suitable location for the probe. This choice is usually made by the motor manufacturer or the motor rewinder, who have all the necessary information.

### Application example

| Insulation class of rotating machines conforming to IEC 60034-11 (S1 duty) | NOT<br>Nominal operating temperature | Temperature at which rapid increase in resistance occurs<br>Probes used for Alarm |             |
|----------------------------------------------------------------------------|--------------------------------------|-----------------------------------------------------------------------------------|-------------|
|                                                                            | °C                                   | °C                                                                                | Fault<br>°C |
| A                                                                          | 100                                  | 100                                                                               | 100         |
| B                                                                          | 110                                  | 110                                                                               | 120         |
| E                                                                          | 120                                  | 120                                                                               | 130         |
| F                                                                          | 140                                  | 140                                                                               | 150         |
| H                                                                          | 160                                  | 160                                                                               | 170         |

<sup>(1)</sup> PTC: Positive Temperature Coefficient.

# Overload relays

Thermistor protection units for use with PTC thermistor probes <sup>(1)</sup>

| Protection unit type     |  | LT3SE                          | LT3SA                             | LT3SM                                |
|--------------------------|--|--------------------------------|-----------------------------------|--------------------------------------|
| Reset method             |  | Automatic                      | Automatic                         | Manual/Automatic                     |
| Fault indication         |  | –                              | On front panel of unit and remote | On front panel of unit and remote    |
| Fault test               |  | –                              | –                                 | By pushbutton on front panel of unit |
| Probe interchangeability |  | Label "Mark A" to IEC 60034-11 | Label "Mark A" to IEC 60034-11    | Label "Mark A" to IEC 60034-11       |

| Environment                               |                                                |                                                                                                                                                                                                          |                                                                                                                                               |             |
|-------------------------------------------|------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| Conforming to standards                   |                                                | IEC 60947-8                                                                                                                                                                                              | IEC 60947-8                                                                                                                                   | IEC 60947-8 |
| Product certifications                    |                                                | UL, CSA                                                                                                                                                                                                  |                                                                                                                                               |             |
| Degree of protection                      |                                                | IP 20 conforming to IEC 60529                                                                                                                                                                            |                                                                                                                                               |             |
| CE marking                                |                                                | LT3S● protection units have been designed to comply with the basic recommendations of European directives relating to low voltage and EMC. Therefore LT3S● products bear the European Community CE mark. |                                                                                                                                               |             |
| Ambient air temperature around the device | Storage<br>Conforming to IEC 60068-2-1 and 2-2 | °C                                                                                                                                                                                                       | - 40...+ 85                                                                                                                                   |             |
|                                           | Operation                                      | °C                                                                                                                                                                                                       | - 25...+ 60                                                                                                                                   |             |
| Maximum operating altitude                | Without derating                               |                                                                                                                                                                                                          | 2000 m                                                                                                                                        |             |
|                                           | With derating                                  |                                                                                                                                                                                                          | Up to 3000 m, the maximum permissible ambient air temperature for operation (60 °C) must be reduced by 5 °C per additional 500 m above 1500 m |             |
| Vibration resistance                      | Conforming to IEC 60068-2-6                    |                                                                                                                                                                                                          | 2.5 gn (2...25 Hz)<br>1 gn (25...150 Hz)                                                                                                      |             |
| Shock resistance                          | Conforming to IEC 60068-2-27                   |                                                                                                                                                                                                          | 5 gn (11 ms)                                                                                                                                  |             |
| Operating positions without derating      | In relation to normal vertical mounting plane  |                                                                                                                                                                                                          | Any position                                                                                                                                  |             |

| Power supply circuit characteristics |               |                |    |            |          |                           |
|--------------------------------------|---------------|----------------|----|------------|----------|---------------------------|
| Rated control circuit voltage (Uc)   | ~ 50/60 Hz    | Single voltage | V  | 115 or 230 | –        | 400                       |
|                                      |               | Dual voltage   | V  | –          | 115/230  | 115/230, 24/48            |
|                                      | ~ 50/60 Hz    | Multivoltage   | V  | –          | 24...230 | 24...230                  |
|                                      |               |                |    |            |          |                           |
|                                      | 0.8...1.1 Uc  | Single voltage | V  | 24         | –        | –                         |
|                                      |               | Dual voltage   | V  | –          | 24/48    | 24/48                     |
|                                      | 0.85...1.1 Uc | Multivoltage   | V  | –          | 24...230 | 24...230                  |
|                                      |               |                |    |            |          |                           |
| Average consumption                  | Sealed        | ~              | VA | < 2.5      | < 2.5    | < 2.5 except (400 V: 2.7) |
|                                      |               | ---            | W  | < 1        | < 1      | < 1                       |

(1) PTC: Positive Temperature Coefficient.

# Overload relays

Thermistor protection units for use with PTC thermistor probes <sup>(1)</sup>

| Control circuit characteristics                          |                                         |     |             |     |             |                     |             |  |
|----------------------------------------------------------|-----------------------------------------|-----|-------------|-----|-------------|---------------------|-------------|--|
| Protection unit type                                     |                                         |     | LT3SE       |     | LT3SA       |                     | LT3SM       |  |
| Resistance                                               | Tripping                                | Ω   | 2700...3100 |     | 2700...3100 |                     | 2700...3100 |  |
|                                                          | Reset                                   | Ω   | 1500...1650 |     | 1500...1650 |                     | 1500...1650 |  |
| Maximum number of probes fitted in series <sup>(2)</sup> | Probes ≤ 250 Ω at 25°                   |     | 6           |     | 6           |                     | 6           |  |
| Voltage at terminals in the thermistor circuit           | Normal operation (R = 1500 Ω)           | V   | < 2.5       |     | < 2.5       |                     | < 2.5       |  |
|                                                          | Conforming to IEC 60034-11 (R = 4000 Ω) | V   | < 7.5       |     | < 7.5       |                     | < 7.5       |  |
| Thermistor probe short-circuit detection                 | Operating threshold                     | Ω   | –           |     | < 20        |                     | < 20        |  |
| Connection of probes to the LT3                          | Distance                                | m   | 300         | 400 | 500         | 1000 <sup>(3)</sup> |             |  |
|                                                          | Minimum c.s.a. of conductors            | mm² | 0.75        | 1   | 1.5         | 2.5                 |             |  |

| Electrical characteristics of the output relay contacts   |                                |          |                                      |                                      |               |  |               |  |
|-----------------------------------------------------------|--------------------------------|----------|--------------------------------------|--------------------------------------|---------------|--|---------------|--|
| Contact type                                              | Single voltage or dual voltage |          | 1 N/C                                |                                      | 1 N/C + 1 N/O |  | 1 N/C + 1 N/O |  |
|                                                           | Multivoltage                   |          | –                                    |                                      | 2 C/O         |  | 2 C/O         |  |
| Rated insulation voltage                                  |                                | V        | ~ 500                                |                                      |               |  |               |  |
| Maximum operational voltage                               |                                | V        | ~ 250 (~ 400 V for <b>LT3SM00V</b> ) |                                      |               |  |               |  |
| Rated impulse withstand voltage                           | Uimp                           | kV       | 2.5                                  |                                      |               |  |               |  |
| Conventional thermal current                              |                                | A        | 5                                    |                                      |               |  |               |  |
| Operational power                                         |                                | At 220 V | VA                                   | 100 for 0.5 million operating cycles |               |  |               |  |
| Breaking capacity                                         | In cat. AC-15                  | 120 V    | A                                    | 6                                    |               |  |               |  |
|                                                           |                                | 250 V    | A                                    | 3                                    |               |  |               |  |
|                                                           | In DC-13                       | 24 V     | A                                    | 2                                    |               |  |               |  |
| Cabling (cage type connector) for flexible or solid cable | Without cable end              | mm²      | 2 x 1...1 x 2.5                      |                                      |               |  |               |  |
|                                                           | With cable end                 | mm²      | 1 x 0.75...2 x 2.5                   |                                      |               |  |               |  |
| Tightening torque                                         |                                | N.m      | 0.8                                  |                                      |               |  |               |  |

| Thermistor probe characteristics |                                        |    |                      |  |  |             |  |
|----------------------------------|----------------------------------------|----|----------------------|--|--|-------------|--|
| Probe type                       |                                        |    | DA1TT●●●             |  |  | DA1TS●●●    |  |
| Conforming to standards          |                                        |    | IEC 60034-11. Mark A |  |  |             |  |
| Resistance                       | At 25 °C                               | Ω  | 3 x 250 in series    |  |  | 250         |  |
| Rated operational voltage (Ue)   | Per probe                              | V  | ~ 2.5 V max          |  |  | ~ 2.5 V max |  |
| Rated insulation voltage (Ui)    |                                        | kV | 2.5                  |  |  | 1           |  |
| Insulation                       |                                        |    | Reinforced           |  |  | Reinforced  |  |
| Length of connecting cables      | Between probes                         | mm | 250                  |  |  | –           |  |
|                                  | Between probe and motor terminal plate | m  | 1                    |  |  | 1           |  |

(1) PTC: Positive Temperature Coefficient.

(2) Provided that the total resistance of the probe circuit is less than 1500 Ω at 20 °C.

(3) For distances greater than 500 m take cabling precautions (twisted shielded pairs).



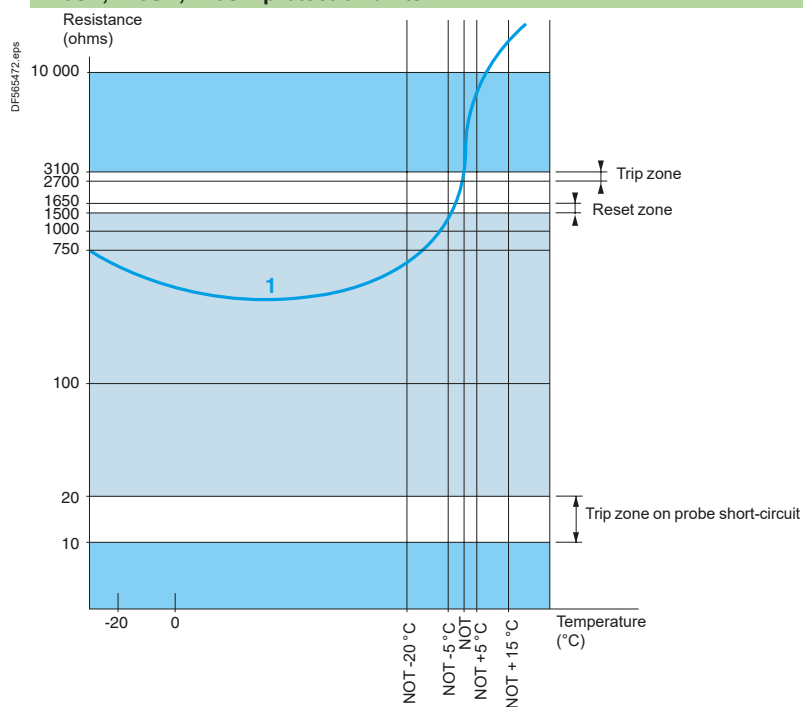
## Overload relays

Thermistor protection units for use with PTC thermistor probes <sup>(1)</sup>

### LT3S protection unit/thermistor probe combination

Guaranteed operating zones: examples with 3 probes type DA1TT●●● (250 Ω at 25 °C) in series, conforming to standard IEC 60034-11, Mark A.

### LT3SE, LT3SA, LT3SM protection units



1 3 probes type DA1TT●●● (250 Ω at 25 °C) in series.

NOT: Nominal Operating Temperature

Protection unit tripped.

Protection unit reset.

<sup>(1)</sup> PTC: Positive Temperature Coefficient.

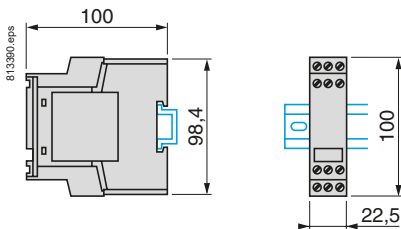
## Overload relays

Thermistor protection units for use with PTC thermistor probes <sup>(1)</sup>

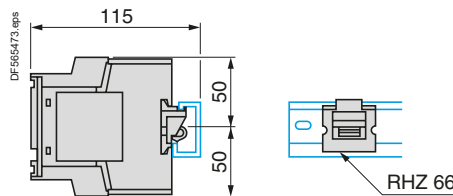
### Dimensions

LT3SE, SA, SM

Mounting on L rail AM1 DP200



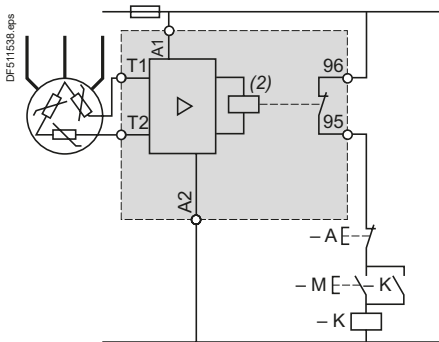
Mounting on 1 L rail  
(with adapter RHZ 66)



### Schemes for "no fault" operation

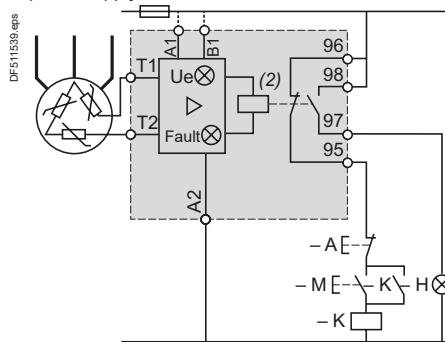
LT3SE00BD (24 V DC), LT3SE00F (115 V AC),  
LT3SE00M (230 V AC)

Without fault memory

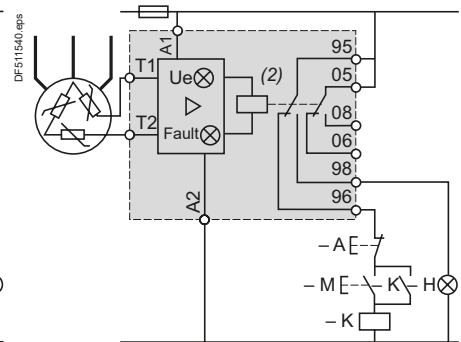


LT3SA00ED (24/48 V DC),  
LT3SA00M (115/230 V AC)

Refer to chart for use of A1/B1 terminal according  
power supply

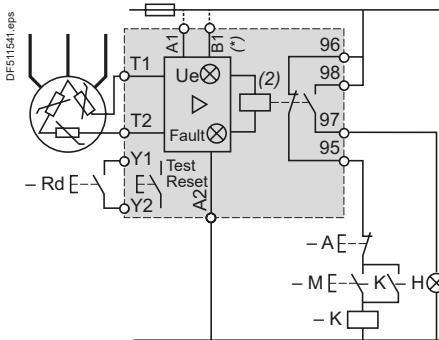


LT3SA00MW (24 to 230V AC/DC)

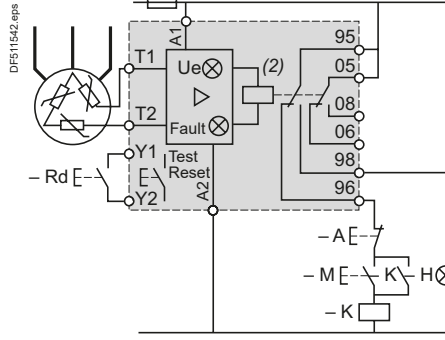


LT3SM00E (24/48V AC), LT3SM00ED (24/48V DC),  
LT3SM00M (115/230 V AC), LT3SM00V (400V AC)

Refer to chart for A1 - A2 - B1 supply terminals to be used



LT3SM00MW (24 to 230 V AC/DC)



(\*) no B1 terminal on LT3SM00V (400V AC).

LT3SA, LT3SM - dual voltage and 400 V -  
power terminal assignment

|                      | 24 V DC          | 48 V DC           |
|----------------------|------------------|-------------------|
| LT3SA00ED, LT3SM00ED |                  |                   |
| Terminals            | B1(+)<br>A2 (0V) | A1(+)<br>A2 (0V)  |
| LT3SA00M, LT3SM00M   |                  |                   |
| Terminals            | A1-B1            | A1-A2             |
| LT3SA00M, LT3SM00M   |                  |                   |
| Terminals            | -                | 400 V AC<br>A1-A2 |

### Setting-up

#### Cabling

It is inadvisable to use the same multi-core cable for the thermistor probe circuit and the power circuit. This is especially important for long cable runs. If it is impossible to comply with the above recommendation, a pair of twisted conductors must be used for the thermistor probe circuit.

#### Testing the insulation of the line connecting the thermistors to the LT3S unit

Before carrying out this test, short-circuit all the terminals of the LT3S protection unit.

Measure the insulation value between these terminals and earth using a megger or a flash tester, progressively increasing the voltage to the value defined by the standards.

#### Checking the PTC thermistor probes for correct operation

With the machine stopped, in the cold state and after having taken all the necessary safety precautions:

- disconnect the line linking the thermistors to the LT3S protection unit, at the terminals of the machine being protected: motor, etc.,
- using an ohmmeter with a voltage rating less than or equal to 2.5 V, measure the resistance of the probe circuit at the machine terminals,
- depending on the number and type of thermistors connected in series, check that their resistance value at 25 °C is correct.

Example: motor fitted with 3 PTC thermistor probes with a resistance  $\leq 250 \Omega$  at 25 °C.

Any value higher than  $250 \times 3 = 750 \Omega$  indicates a problem.

(1) PTC: Positive Temperature Coefficient.

(2) Relay energised: the contacts are shown in the "operating" position.

References:

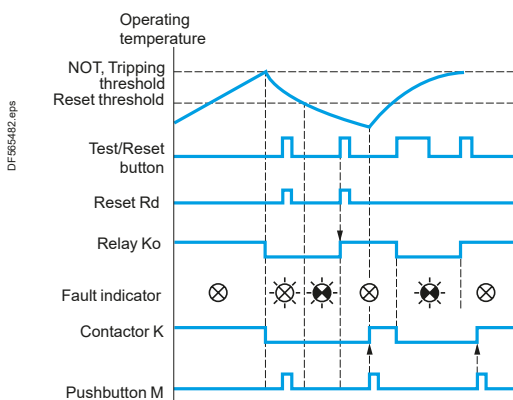
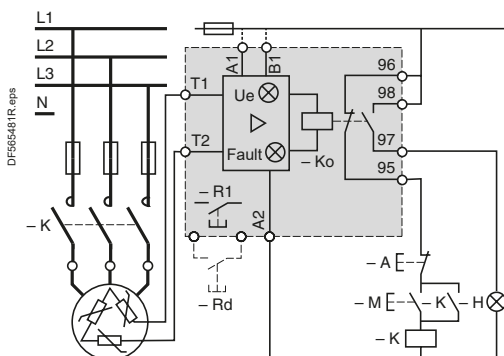
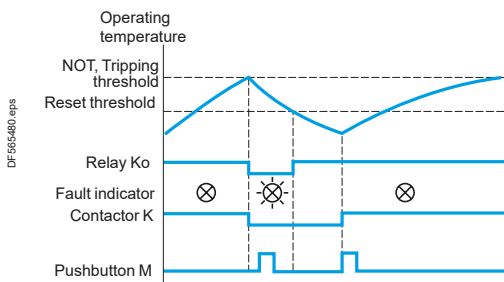
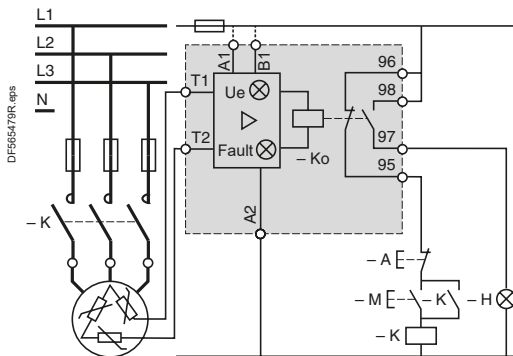
pages B11/17 and B11/18

Characteristics:

pages B11/53 to B11/55

## Overload relays

Thermistor protection units for use with PTC thermistor probes <sup>(1)</sup>



### LT3SA protection units

#### Starting

The LT3SA is normally energised and its internal relay is in the pre-energised position. The motor is started by operating pushbutton M automatically held in by K (3-wire control circuit).

#### Thermal fault

The strong increase in resistance of the PTC probes at the moment their temperature reaches the nominal operating temperature (NOT) is detected by the LT3SA unit and causes the relay to drop out; indicator H comes on, as does the built-in indicator on unit LT3SA. Contactor K drops out and pressing button M has no effect.

#### Reset

As the motor cools, it reaches the reset threshold, 2 to 3 °C below the nominal operating temperature. The relay resets and the motor can be started by pressing button M.

### LT3SM protection units

Operation is very similar to that described above, except for the following:

#### Reset

After tripping on thermal fault and cooling to the reset threshold, the Test/RESET button on the unit (R1) or a remote reset button (Rd) must be pressed to energise the relay.

The fault is therefore memorised, even though the temperature of the probes has dropped to well below the reset threshold.

#### Signalling circuit

As the relay is fitted with 2 separate contacts, the signalling voltage may be different from the contactor control voltage.

#### Test

Pressing the Test/RESET button simulates a fault and causes the relay to drop out: the FAULT indicator comes on, as does the remote signalling indicator. The unit is reset by pressing the Test/RESET button again.

<sup>(1)</sup> PTC: Positive Temperature Coefficient.

## Overload relays

Electronic over current relays for TeSys D contactors, for standalone use

### Presentation



LR97D



LT47

LR97D and LT47 electronic over current relays have been developed to satisfy machine protection requirements. These relays have definite time characteristics: current threshold and time based function. They are particularly recommended for providing mechanical protection on machines with high resistive torque, high inertia and with strong probability of jamming under steady state conditions. They can be used for motor protection in the case of long starting times or frequent starting. The LR97D relay also incorporates two fixed time protection functions, one of 0.5 seconds against locked rotor and one of 3 seconds against phase failure. LR97D and LT47 can be used to provide mechanical shock protection. In this case, setting the O-Time knob to minimum will ensure tripping in 0.3 seconds. TeSys LR97D is designed to be directly connected downstream of the TeSys D contactor. TeSys LT47 provides two current transformers, to be crossed by the motor power cables.

### Applications

LR97D and LT47 relays are particularly suitable for the following machines:

- Monitoring function for excessively long starting time on machines with a risk of difficult starting:
  - Machines with high resistive torque, high inertia machines.
- Monitoring of machines during steady state operation: overtorque detection function
  - Machines with strong risk of jamming, machines with torque build-up over time,
  - Mechanical failure monitoring,
  - Faster detection of malfunctioning on machines where the motor is oversized in relation to its thermal protection I<sup>2</sup>t.
- Motor protection for specific applications:
  - Machines with long starting times,
  - Machines with high on-load factor: more than 30 to 50 starts/hour,
  - Machine with fluctuating load from a steady state, where the thermal image of a thermal overload relay (thermal memory) is unsuitable in relation to actual overheating of the motor.

### Examples of machines:

- Conveyors, crushers and mixers,
- Fans, pumps and compressors,
- Centrifuges and spin-dryers,
- Presses, shearing machines, saws, broaching machines, sanders and lifting hoists.

### Operation

Because of their two separate time settings, LR97D and LT47 relays can be combined with the motor-starter function:

D-Time: starting time, O-Time: trip time during steady state.

The D-Time function is only available during the motor starting phase. During this phase the overload detection function is inhibited in order to allow starting. Under steady state conditions, when the motor current is greater than the setting current due to an overload or single-phasing, the red LED lights up and the internal relay switches its contact after a time preset by the O-Time knob.

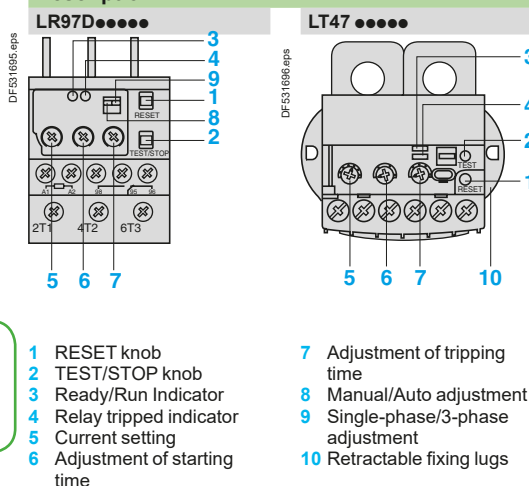
The red LED stays on, indicating that the relay has tripped.

The relays are simple to set, in 5 easy steps:

- Adjust the 3 knobs to maximum (Load, D-Time and O-Time),
- Adjust the D-Time knob to the value corresponding to the motor starting time.
- When the motor reaches steady state, adjust the Load knob (turn the knob counter-clockwise until the red LED starts to flicker).
- Slowly turn the Load knob clockwise until the LED goes out.
- Set the required tripping time, using the O-Time knob.

### Description

#### Description



#### Status signalling

##### LR97D

To assist fast diagnostics, two LEDs (one green and one red) allow signalling of the operating status:

| Status       | LED signal       |         |
|--------------|------------------|---------|
|              | Green LED        | Red LED |
| Voltage      | On               | Off     |
| Starting     |                  |         |
| Steady state | On               | Off     |
| Overload     | On               |         |
| Trip         | Over-current     | Off     |
|              | Rotor locked     | Off     |
|              | Phase failure L1 | Off     |
|              | Phase failure L2 | Off     |

##### LT47

| Condition    | LED signal |         |
|--------------|------------|---------|
|              | Green LED  | Red LED |
| Voltage      | On         | Off     |
| Starting     |            |         |
| Steady state | On         | Off     |
| Overload     | On         |         |
| Trip         | Off        | On      |

# Overload relays

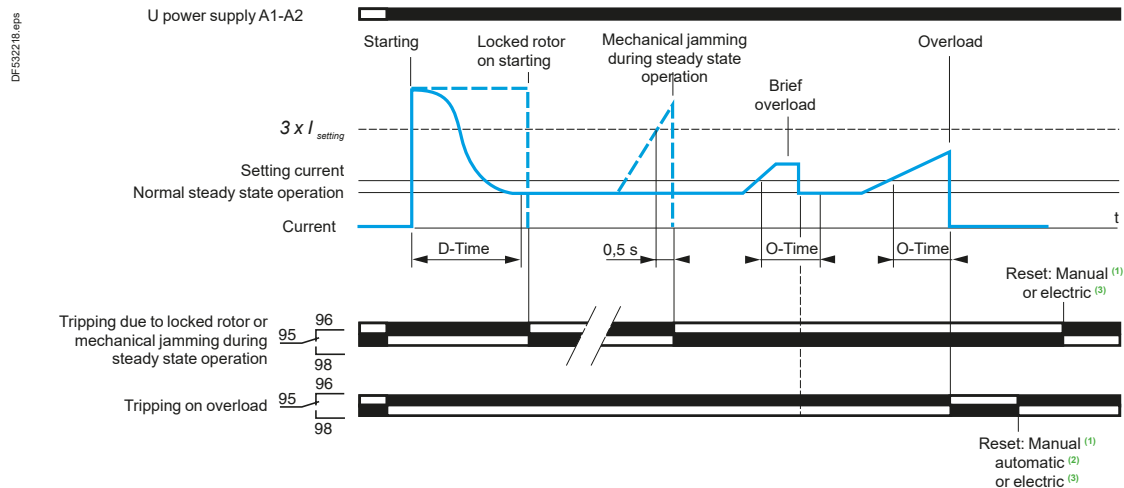
Electronic over current relays for TeSys D contactors, for standalone use

## Curves

### LR97D

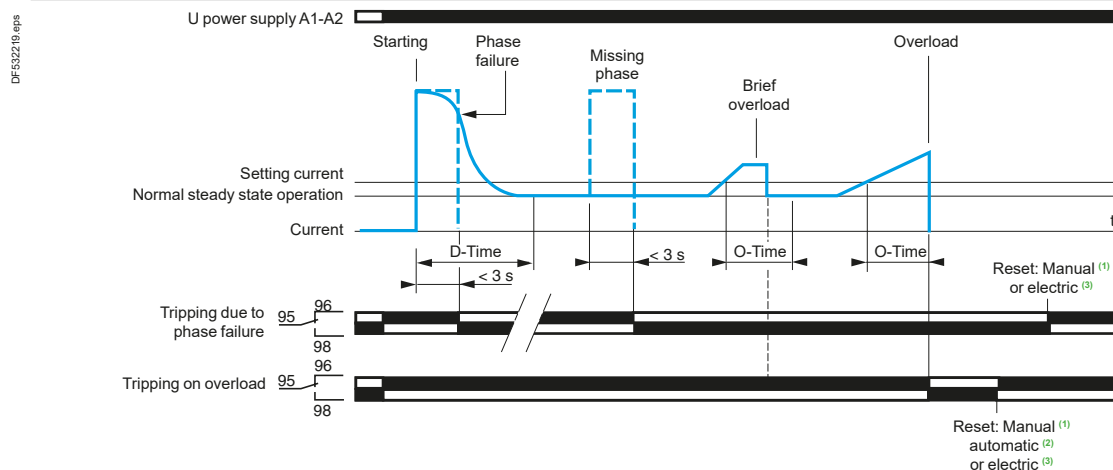
#### Overload protection

##### Protection against locked rotor and mechanical jamming under steady state conditions

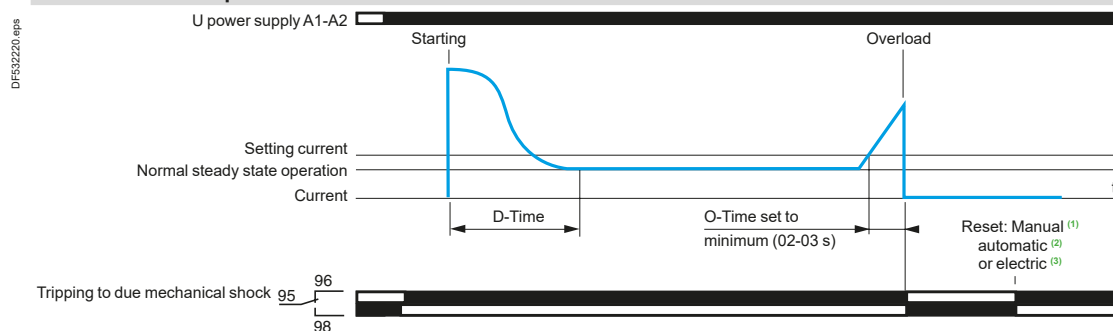


#### Overload protection

##### Protection against phase failure during starting and during steady state operation



#### Mechanical shock protection



(1) By Reset button.

(2) Fixed time of 120 s. Selectable by dip switch. Function not available in the event of tripping due to locked rotor/mechanical jamming ( $I > 3 \times I_{\text{setting}}$ ) or phase failure.

(3) By brief interruption of power supply, minimum 0.1 s.

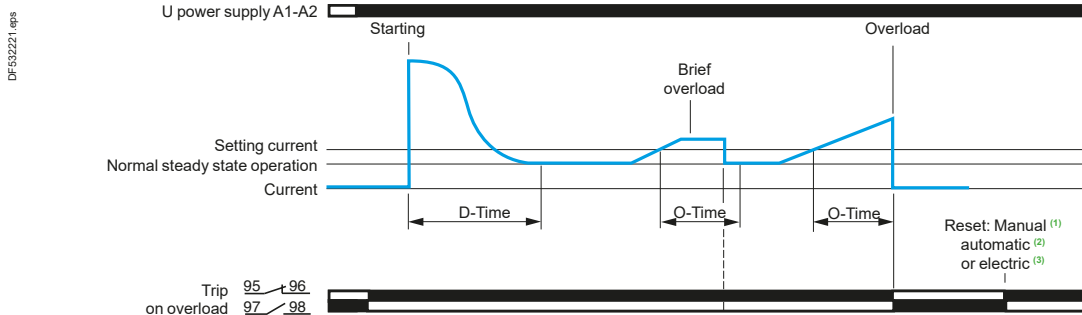
## Overload relays

Electronic over current relays for TeSys D contactors, for standalone use

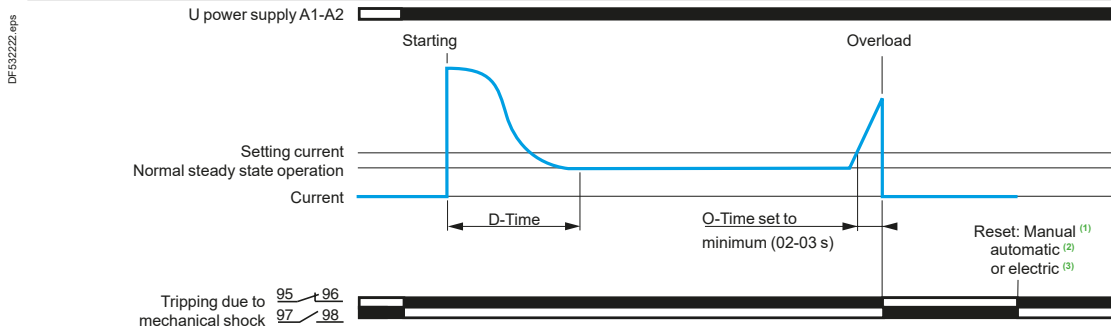
### Curves

#### LT47

##### Overload protection



##### Mechanical shock protection



(1) By Reset button.

(2) Only available on version with automatic reset (LT47●●●●A). Time adjustable from 1 to 120 s with the R-Time knob.

(3) By brief interruption of power supply, minimum 0.1 s.

### Characteristics

#### Environment

| Relay type                                       |                                                       | LR97D●●●●●                                                                                                                   | LT47●●●●●                                                                                                                    |
|--------------------------------------------------|-------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|
| Conforming to standards                          |                                                       | IEC/EN 60947-4-1, IEC/EN 60947-5-1, UL 60947-4-1, CSA C22.2 n° 60947-4-1, UL 60947-5-1, CSA C22.2 n° 60947-5-1, GB/T 14048.5 | IEC/EN 60947-4-1, IEC/EN 60947-5-1, UL 60947-4-1, CSA C22.2 n° 60947-4-1, UL 60947-5-1, CSA C22.2 n° 60947-5-1, GB/T 14048.5 |
| Product certifications                           |                                                       | UL, CSA, CCC, EAC                                                                                                            | UL, CSA, CCC, EAC                                                                                                            |
| Degree of protection                             | Conforming to IEC 60529                               | IP 20 (front face)                                                                                                           | IP 20 (front face)                                                                                                           |
| Ambient air temperature around the device        | Storage                                               | °C - 30...+ 80                                                                                                               | - 30...+ 80                                                                                                                  |
|                                                  | Normal operation without derating (IEC 60947-4-1)     | °C - 25...+ 60                                                                                                               | - 25...+ 60                                                                                                                  |
| Maximum operating altitude                       | m                                                     | 2000                                                                                                                         | 2000                                                                                                                         |
| Operating positions without derating             | In relation to normal vertical mounting plane         | Any position                                                                                                                 | Any position                                                                                                                 |
| Shock resistance                                 | Permissible acceleration conforming to IEC 60068-2-27 | 15 gn - 11 ms                                                                                                                | 15 gn - 11 ms                                                                                                                |
| Vibration resistance                             | Permissible acceleration conforming to IEC 60068-2-6  | 4 gn                                                                                                                         | 4 gn                                                                                                                         |
| Dielectric strength at 50 Hz                     | Conforming to IEC 60947-4-1                           | kV 2                                                                                                                         | 2                                                                                                                            |
| Surge withstand                                  | Conforming to IEC 61000-4-5                           | kV 6                                                                                                                         | 6                                                                                                                            |
| Resistance to electrostatic discharge            | In open air                                           | kV 8 (level 3)                                                                                                               | 8 (level 3)                                                                                                                  |
|                                                  | In direct mode                                        | kV 6 (level 3)                                                                                                               | 6 (level 3)                                                                                                                  |
| Immunity to radiated radio-frequency disturbance |                                                       | V/m 10 (level 3)                                                                                                             | 10 (level 3)                                                                                                                 |
| Immunity to fast transient currents              |                                                       | kV 2                                                                                                                         | 2                                                                                                                            |
| Conducted emissions                              | Conforming to EN 55011                                | Class A                                                                                                                      | Class A                                                                                                                      |
| Conducted HF disturbance                         | Conforming to EN 61000-4-6                            | V 10                                                                                                                         | 10                                                                                                                           |

# Overload relays

Electronic over current relays for TeSys D contactors, for standalone use

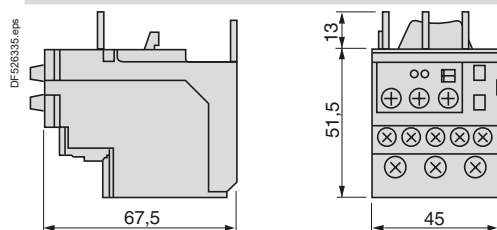
| Characteristics                                                                                       |                             |                                                        |     |                                                 |              |                                                 |              |                                                 |        |              |         |
|-------------------------------------------------------------------------------------------------------|-----------------------------|--------------------------------------------------------|-----|-------------------------------------------------|--------------|-------------------------------------------------|--------------|-------------------------------------------------|--------|--------------|---------|
| Auxiliary contact characteristics                                                                     |                             |                                                        |     |                                                 |              |                                                 |              |                                                 |        |              |         |
| Relay type                                                                                            |                             |                                                        |     | LR97D●●●●●                                      |              |                                                 |              | LT47●●●●●                                       |        |              |         |
| Contact type                                                                                          |                             |                                                        |     | 1 NO/NC                                         |              |                                                 |              | 1 N/O + 1N/C                                    |        |              |         |
| Conventional thermal current                                                                          |                             |                                                        | A   | 3                                               |              |                                                 |              | 3                                               |        |              |         |
| Maximum hold consumption of controlled contactor coils (occasional operating cycles of contact 95-96) | Conforming to IEC 60947     |                                                        | V   | ~ 24                                            | ~ 48         | ~ 110                                           | ~ 220        | ~ 24                                            | ~ 48   | ~ 110        | ~ 220   |
|                                                                                                       |                             |                                                        | VA  | 70                                              | 140          | 360                                             | 360          | 70                                              | 140    | 360          | 360     |
|                                                                                                       |                             |                                                        | V   | --- 24                                          | --- 48       | --- 110                                         | --- 220      | --- 24                                          | --- 48 | --- 110      | --- 220 |
|                                                                                                       |                             |                                                        | W   | 55                                              | 55           | 28                                              | 28           | 55                                              | 55     | 28           | 28      |
| Short-circuit protection                                                                              |                             | By gG, BS fuses. Maximum rating or GB2 circuit breaker | A   | 3                                               |              |                                                 |              | 3                                               |        |              |         |
| Connection by cable or lug-clamps                                                                     |                             |                                                        |     |                                                 |              |                                                 |              |                                                 |        |              |         |
| Flexible cable without cable end                                                                      | 1 or 2 conductors           | Min.                                                   | mm² | 1 x 0.75                                        |              |                                                 |              | 1 x 1                                           |        |              |         |
|                                                                                                       |                             | Max.                                                   | mm² | 2 x 2.5                                         |              |                                                 |              | 2 x 2.5                                         |        |              |         |
| Flexible cable with cable end                                                                         | 1 or 2 conductors           | Min.                                                   | mm² | 1 x 0.34                                        |              |                                                 |              | 1 x 1                                           |        |              |         |
|                                                                                                       |                             | Max.                                                   | mm² | 1 x 1.5 + 1 x 2.5                               |              |                                                 |              | 2 x 2.5                                         |        |              |         |
| External Ø of lugs                                                                                    |                             |                                                        | mm  | 7                                               |              |                                                 |              | 7                                               |        |              |         |
| Ø of screw                                                                                            |                             |                                                        | mm  | M3                                              |              |                                                 |              | M3.5                                            |        |              |         |
| Tightening torque                                                                                     |                             |                                                        | N.m | 0.6...1.2                                       |              |                                                 |              | 0.8...1.7                                       |        |              |         |
| Electrical characteristics of power circuit                                                           |                             |                                                        |     |                                                 |              |                                                 |              |                                                 |        |              |         |
| Relay type                                                                                            |                             |                                                        |     | LR97D015●● to LR97D25●●                         |              | LR97D38●●                                       |              | LT47●●●●●                                       |        |              |         |
| Setting range                                                                                         |                             | Depending on model                                     | A   | 0.3...38                                        |              |                                                 |              | 0.5...60                                        |        |              |         |
| Tripping class                                                                                        |                             |                                                        |     | Adjustable                                      |              |                                                 |              | Adjustable                                      |        |              |         |
| Rated insulation voltage (Ui)                                                                         | Conforming to IEC 60947-4-1 |                                                        | V   | 690                                             |              |                                                 |              | 690                                             |        |              |         |
|                                                                                                       | Conforming to UL, CSA       |                                                        | V   | 600                                             |              |                                                 |              | 600                                             |        |              |         |
| Rated impulse withstand voltage (Uimp)                                                                |                             |                                                        | kV  | 6                                               |              |                                                 |              | 6                                               |        |              |         |
| Frequency limits                                                                                      |                             | Of the operating current                               | Hz  | 50...60                                         |              |                                                 |              | 50...60                                         |        |              |         |
| Connection by cable or lug-clamps                                                                     |                             |                                                        |     |                                                 |              |                                                 |              |                                                 |        |              |         |
| Flexible cable without cable end                                                                      | 1 conductor                 | Min.                                                   | mm² | 1.5                                             |              | 2.5                                             |              | —                                               |        |              |         |
|                                                                                                       |                             | Max.                                                   | mm² | 10                                              |              | 10                                              |              | —                                               |        |              |         |
| Flexible cable with cable end                                                                         | 1 conductor                 | Min.                                                   | mm² | 1                                               |              | 1                                               |              | —                                               |        |              |         |
|                                                                                                       |                             | Max.                                                   | mm² | 4                                               |              | 6                                               |              | —                                               |        |              |         |
| External Ø of lugs                                                                                    |                             |                                                        | mm  | 10                                              |              | 12                                              |              | —                                               |        |              |         |
| Ø of screw                                                                                            |                             |                                                        | mm  | M4                                              |              | M4                                              |              | —                                               |        |              |         |
| Tightening torque                                                                                     |                             |                                                        | N.m | 2                                               |              | 2                                               |              | —                                               |        |              |         |
| Operating characteristics                                                                             |                             |                                                        |     |                                                 |              |                                                 |              |                                                 |        |              |         |
| Relay type                                                                                            |                             |                                                        |     | LR97D●●●●●                                      |              | LT47●●●●S                                       |              | LT47●●●●A                                       |        |              |         |
| Adjustment                                                                                            | Current                     |                                                        | A   | "Load" knob                                     |              | "Load" knob                                     |              | "Load" knob                                     |        |              |         |
|                                                                                                       | Time                        | D-time knob                                            | s   | 0.5...30                                        |              | 0.5...30                                        |              | —                                               |        |              |         |
|                                                                                                       |                             | O-time knob                                            | s   | 0.2/0.3...10                                    |              | 0.2/0.3...10                                    |              | 0.2/0.3...30                                    |        |              |         |
|                                                                                                       |                             | R-time knob                                            | s   | —                                               |              | —                                               |              | 1...120                                         |        |              |         |
| Reset                                                                                                 | Manual                      |                                                        |     | Reset button                                    |              | Reset button                                    |              | Reset button                                    |        |              |         |
|                                                                                                       | Automatic                   |                                                        |     | 120 s fixed                                     |              | —                                               |              | R-time knob: 1-120 s                            |        |              |         |
|                                                                                                       | Electrical                  |                                                        |     | By interruption of power supply (minimum 0.1 s) |              | By interruption of power supply (minimum 0.1 s) |              | By interruption of power supply (minimum 0.1 s) |        |              |         |
| Protection functions                                                                                  |                             |                                                        |     | On starting                                     |              | Steady state                                    |              | On starting                                     |        | Steady state | —       |
| Overload I <sub>max</sub> > I <sub>setting</sub>                                                      | Tripping                    |                                                        |     | Inhibited during D-time                         | After O-time | Inhibited during D-time                         | After O-time | After O-time                                    |        |              |         |
| Locked rotor, mechanical jamming I > 3 x I <sub>setting</sub>                                         | Tripping                    |                                                        |     | After D-time                                    | < 0.5 s      | Inhibited during D-time                         | After O-time | After O-time                                    |        |              |         |
| Sensitivity to phase failure                                                                          | Tripping                    |                                                        |     | < 3 s                                           | < 3 s        | Inhibited during D-time                         | After O-time | After O-time                                    |        |              |         |
| Status and fault signalling (see table page 24517/2)                                                  |                             |                                                        |     | 2 LEDs                                          |              | 2 LEDs                                          |              | 2 LEDs                                          |        |              |         |
| TEST/STOP function                                                                                    | Test                        |                                                        |     | No load                                         |              | No load                                         |              | No load                                         |        |              |         |
|                                                                                                       | Stop                        |                                                        |     | Under load                                      |              | Under load                                      |              | Under load                                      |        |              |         |
| Sealing                                                                                               |                             |                                                        |     | Yes                                             |              | Yes                                             |              | Yes                                             |        |              |         |

## Overload relays

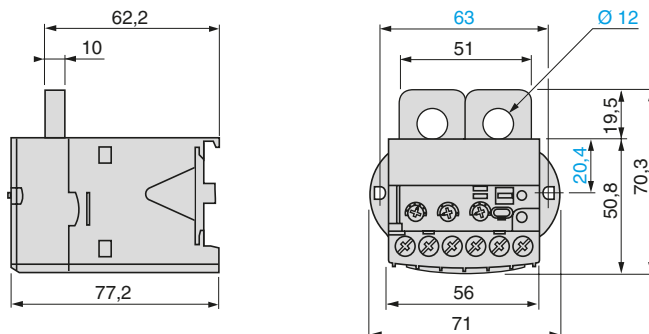
Electronic over current relays for TeSys D contactors, for standalone use

### Dimensions

#### LR97D●●●●



#### LT47●●●●

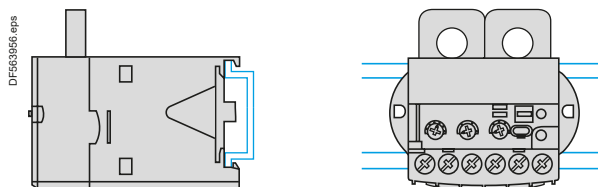
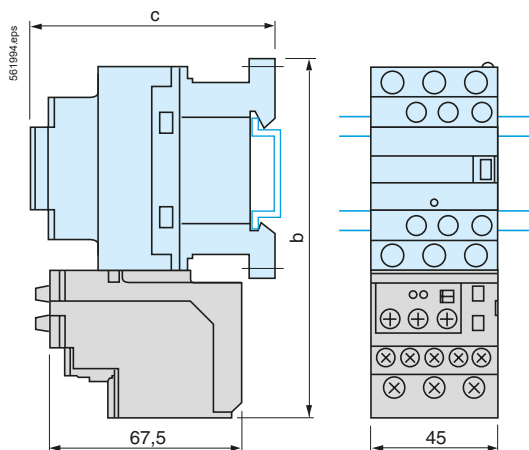


### Mounting

#### LR97D●●●●

Direct mounting beneath the contactor

#### LT47●●●●

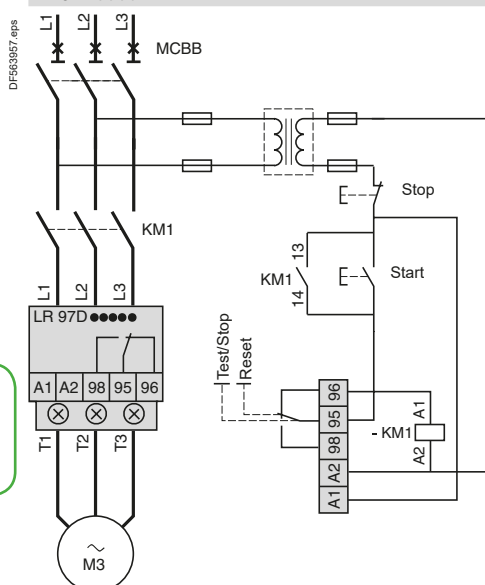


| LC1 | D09...D18                 | D25...D38 |
|-----|---------------------------|-----------|
| b   | 123                       | 137       |
| c   | See pages B8/76 and B8/77 |           |

Note: Can be mounted on rail.

### Schemes

#### LR97D●●●●



#### LT47●●●●

