
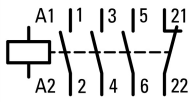




**Contactor, 3 pole, 380 V 400 V 15 kW, 1 NC, 24 V 50 Hz, AC operation, Spring-loaded terminals**

**Part no. DILMC32-01(24V50HZ)**  
**Catalog No. 277720**  
**Alternate Catalog No. XTCEC032C01U**

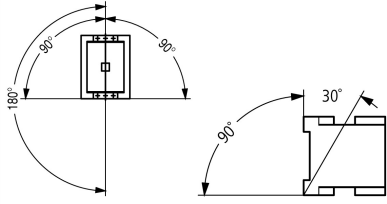
**Delivery program**

|   |                |    |   |
|---|----------------|----|---|
| Product range   |                |    | Contactors  |
| Application   |                |    | Contactors for Motors   |
| Subrange  |                |    | Contactors up to 170 A, 3 pole  |
| Utilization category                                      |                |    | AC-1: Non-inductive or slightly inductive loads, resistance furnaces<br>AC-3/AC-3e: Normal AC induction motors: Starting, switching off while running<br>AC-4: Normal AC induction motors: starting, plugging, reversing, inching |
| Notes   |                |    | <br>Also suitable for motors with efficiency class IE3.<br>IE3-ready devices are identified by the logo on their packaging.                     |
| Connection technique                                      |                |    | Spring-loaded terminals   |
| Description   |                |    | Spring-cage terminals on auxiliary and control circuit terminals  |
| Number of poles   |                |    | 3 pole  |
| <b>Rated operational current</b>                          |                |    |   |
| AC-3  |                |    |   |
| Notes   |                |    | At maximum permissible ambient temperature (open.)<br>Also tested according to AC-3e.   |
| 380 V 400 V   | $I_e$          | A  | 32  |
| AC-1  |                |    |   |
| Conventional free air thermal current, 3 pole, 50 - 60 Hz |                |    |   |
| Open  |                |    |   |
| at 40 °C  | $I_{th} = I_e$ | A  | 45  |
| enclosed  | $I_{th}$       | A  | 36  |
| Conventional free air thermal current, 1 pole             |                |    |   |
| open  | $I_{th}$       | A  | 100   |
| enclosed  | $I_{th}$       | A  | 90  |
| <b>Max. rating for three-phase motors, 50 - 60 Hz</b>     |                |    |   |
| AC-3  |                |    |   |
| 220 V 230 V   | P              | kW | 10  |
| 380 V 400 V   | P              | kW | 15  |
| 660 V 690 V   | P              | kW | 17  |
| AC-4  |                |    |   |
| 220 V 230 V   | P              | kW | 4   |
| 380 V 400 V   | P              | kW | 7   |
| 660 V 690 V   | P              | kW | 10  |
| <b>Contacts</b>   |                |    |   |
| N/C = Normally closed                                     |                |    | 1 NC  |
| Contact sequence  |                |    |   |
| Instructions  |                |    | Contacts to EN 50 012.<br>Auxiliary current, coil connections with spring-cage connection technology.<br>Main current connections with screw terminals.<br>with mirror contact.   |
| Can be combined with auxiliary contact                    |                |    | DILA-XHIC(V)...   |
| Actuating voltage   |                |    | 24 V 50 Hz  |

|                            |  |              |
|----------------------------|--|--------------|
| Voltage AC/DC              |  | AC operation |
| Connection to SmartWire-DT |  | no           |
| Frame size                 |  | 2            |

## Technical data

### General

|   |              |                 |  |
|---|--------------|-----------------|--|
| Standards   |              |                 | IEC/EN 60947, VDE 0660, UL, CSA  |
| Lifespan, mechanical  |              |                 |  |
| AC operated   | Operations   | $\times 10^6$   | 10   |
| Operating frequency, mechanical                                       |              |                 |  |
| AC operated   | Operations/h |                 | 5000   |
| Climatic proofing   |              |                 | Damp heat, constant, to IEC 60068-2-78<br>Damp heat, cyclic, to IEC 60068-2-30     |
| Ambient temperature   |              |                 |  |
| Open  |              | °C              | -25 - +60  |
| Enclosed  |              | °C              | - 25 - 40  |
| Storage   |              | °C              | - 40 - 80  |
| Mounting position   |              |                 |  |
| Mechanical shock resistance (IEC/EN 60068-2-27)                       |              |                 |  |
| Half-sinusoidal shock, 10 ms  |              |                 |  |
| Main contacts   |              |                 |  |
| N/O contact   |              | g               | 10   |
| Auxiliary contacts  |              |                 |  |
| N/O contact   |              | g               | 7  |
| N/C contact   |              | g               | 5  |
| Mechanical shock resistance (IEC/EN 60068-2-27) when tabletop-mounted |              |                 |  |
| Half-sinusoidal shock, 10 ms  |              |                 |  |
| Main contacts   |              |                 |  |
| N/O contact   |              | g               | 6.9  |
| Auxiliary contacts  |              |                 |  |
| N/O contact   |              | g               | 5.3  |
| N/C contact   |              | g               | 3.5  |
| Degree of Protection  |              |                 | IP00   |
| Protection against direct contact when actuated from front (EN 50274) |              |                 | Finger and back-of-hand proof  |
| Altitude  |              | m               | Max. 2000  |
| Weight  |              |                 |  |
| AC operated   |              | kg              | 0.433  |
| Screw connector terminals   |              |                 |  |
| Terminal capacity main cable  |              |                 |  |
| Solid   |              | mm <sup>2</sup> | 1 x (0.75 - 16)<br>2 x (0.75 - 10)   |
| Flexible with ferrule   |              | mm <sup>2</sup> | 1 x (0.75 - 16)<br>2 x (0.75 - 10)   |
| Stranded  |              | mm <sup>2</sup> | 1 x 16   |
| Solid or stranded   |              | AWG             | single 18 - 6, double 18 - 8   |
| Stripping length  |              | mm              | 10   |
| Terminal screw  |              |                 | M5   |
| Tightening torque   |              | Nm              | 3.2  |
| Tool  |              |                 |  |
| Pozidriv screwdriver  |              | Size            | 2  |
| Standard screwdriver  |              | mm              | 0.8 x 5.5<br>1 x 6   |

|  |  |                 |                                      |
|--|--|-----------------|--------------------------------------|
| Spring-loaded terminal connection        |  |                 |                                      |
| Terminal capacity control circuit cables |  |                 |                                      |
| Flexible                                 |  | mm <sup>2</sup> | 1 x (0.75 - 2.5)<br>2 x (0.75 - 2.5) |
| Flexible with ferrule                    |  | mm <sup>2</sup> | 1 x (0.75 - 1.5)<br>2 x (0.75 - 1.5) |
| Solid or stranded                        |  | AWG             | 18 - 14                              |
| Stripping length                         |  | mm              | 10                                   |
| Tool                                     |  |                 |                                      |
| Screwdriver blade width                  |  | mm              | 3.5                                  |

### Main conducting paths

|  |             |      |       |
|--|-------------|------|-------|
| Rated impulse withstand voltage        | $U_{imp}$   | V AC | 8000  |
| Overvoltage category/pollution degree  |             |      | III/3 |
| Rated insulation voltage               | $U_i$       | V AC | 690   |
| Rated operational voltage              | $U_e$       | V AC | 690   |
| Safe isolation to EN 61140             |             |      |       |
| between coil and contacts              |             | V AC | 440   |
| between the contacts                   |             | V AC | 440   |
| Making capacity (p.f. to IEC/EN 60947) |             |      |       |
|  | Up to 690 V | A    | 384   |
| Breaking capacity                      |             |      |       |
| 220 V 230 V                            |             | A    | 320   |
| 380 V 400 V                            |             | A    | 320   |
| 500 V                                  |             | A    | 320   |
| 660 V 690 V                            |             | A    | 180   |
| Short-circuit rating                   |             |      |       |
| Short-circuit protection maximum fuse  |             |      |       |
| Type "2" coordination                  |             |      |       |
| 400 V                                  | gG/gL 500 V | A    | 63    |
| 690 V                                  | gG/gL 690 V | A    | 35    |
| Type "1" coordination                  |             |      |       |
| 400 V                                  | gG/gL 500 V | A    | 125   |
| 690 V                                  | gG/gL 690 V | A    | 63    |

### AC

|   |                |   |   |
|---|----------------|---|---|
| AC-1  |                |   |   |
| Rated operational current                                 |                |   |   |
| Conventional free air thermal current, 3 pole, 50 - 60 Hz |                |   |   |
| Open  |                |   |   |
| at 40 °C  | $I_{th} = I_e$ | A | 45  |
| at 50 °C  | $I_{th} = I_e$ | A | 43  |
| at 55 °C  | $I_{th} = I_e$ | A | 42  |
| at 60 °C  | $I_{th} = I_e$ | A | 40  |
| enclosed  | $I_{th}$       | A | 36  |
| Conventional free air thermal current, 1 pole             |                |   |   |
| open  | $I_{th}$       | A | 100   |
| enclosed  | $I_{th}$       | A | 90  |
| AC-3  |                |   |   |
| Rated operational current                                 |                |   |   |
| Open, 3-pole: 50 – 60 Hz                                  |                |   |   |
| Notes   |                |   |   |
|   |                |   | At maximum permissible ambient temperature (open.)<br>Also tested according to AC-3e. |
| 220 V 230 V   | $I_e$          | A | 32  |
| 240 V   | $I_e$          | A | 32  |
| 380 V 400 V   | $I_e$          | A | 32  |
| 415 V   | $I_e$          | A | 32  |
| 440V  | $I_e$          | A | 32  |

|                          |       |     |     |
|--------------------------|-------|-----|-----|
| 500 V                    | $I_e$ | A   | 32  |
| 660 V 690 V              | $I_e$ | A   | 18  |
| 380 V 400 V              | $I_e$ | A   | 32  |
| Motor rating             | P     | kWh |     |
| 220 V 230 V              | P     | kW  | 10  |
| 240V                     | P     | kW  | 11  |
| 380 V 400 V              | P     | kW  | 15  |
| 415 V                    | P     | kW  | 19  |
| 440 V                    | P     | kW  | 20  |
| 500 V                    | P     | kW  | 23  |
| 660 V 690 V              | P     | kW  | 17  |
| <b>AC-4</b>              |       |     |     |
| Open, 3-pole: 50 – 60 Hz |       |     |     |
| 220 V 230 V              | $I_e$ | A   | 15  |
| 240 V                    | $I_e$ | A   | 15  |
| 380 V 400 V              | $I_e$ | A   | 15  |
| 415 V                    | $I_e$ | A   | 15  |
| 440 V                    | $I_e$ | A   | 15  |
| 500 V                    | $I_e$ | A   | 15  |
| 660 V 690 V              | $I_e$ | A   | 12  |
| Motor rating             | P     | kWh |     |
| 220 V 230 V              | P     | kW  | 4   |
| 240 V                    | P     | kW  | 4.5 |
| 380 V 400 V              | P     | kW  | 7   |
| 415 V                    | P     | kW  | 7.5 |
| 440 V                    | P     | kW  | 8   |
| 500 V                    | P     | kW  | 9   |
| 660 V 690 V              | P     | kW  | 10  |

## DC

|                                 |       |   |    |
|---------------------------------|-------|---|----|
| Rated operational current, open |       |   |    |
| <b>DC-1</b>                     |       |   |    |
| 60 V                            | $I_e$ | A | 40 |
| 110 V                           | $I_e$ | A | 40 |
| 220 V                           | $I_e$ | A | 40 |

## Current heat loss

|  |  |    |      |
|--|--|----|------|
| 3 pole, at $I_{th}$ (60°)                |  | W  | 10.3 |
| Current heat loss at $I_e$ to AC-3/400 V |  | W  | 6.6  |
| Impedance per pole                       |  | mΩ | 2.7  |

## Magnet systems

|  |          |         |           |
|--|----------|---------|-----------|
| Voltage tolerance  |          |         |           |
| AC operated  | Pick-up  | $x U_c$ | 0.8 - 1.1 |
| Drop-out voltage AC operated                                       | Drop-out | $x U_c$ | 0.3 - 0.6 |
| Power consumption of the coil in a cold state and $1.0 \times U_S$ |          |         |           |
| 50 Hz  | Pick-up  | VA      | 52        |
| 50 Hz  | Sealing  | VA      | 7.1       |
| 50 Hz  | Sealing  | W       | 2.1       |
| 60 Hz  | Pick-up  | VA      | 67        |
| 60 Hz  | Sealing  | VA      | 8.7       |
| 60 Hz  | Sealing  | W       | 2.1       |
| Duty factor  |          | % DF    | 100       |
| Changeover time at 100 % $U_S$ (recommended value)                 |          |         |           |
| Main contacts  |          |         |           |
| AC operated  |          |         |           |
| Closing delay  |          | ms      | 16 - 22   |

|  |    |                 |
|--|----|-----------------|
| Opening delay                              | ms | 8 - 14          |
| Arcing time                                | ms | 10              |
| <b>Electromagnetic compatibility (EMC)</b> |    |                 |
| Emitted interference                       |    | to EN 60947-1   |
| Interference immunity                      |    | to EN 60947-1   |
| <b>Rating data for approved types</b>      |    |                 |
| Switching capacity                         |    |                 |
| Maximum motor rating                       |    |                 |
| Three-phase                                |    |                 |
| 200 V<br>208 V                             | HP | 10              |
| 230 V<br>240 V                             | HP | 10              |
| 460 V<br>480 V                             | HP | 20              |
| 575 V<br>600 V                             | HP | 25              |
| Single-phase                               |    |                 |
| 115 V<br>120 V                             | HP | 2               |
| 230 V<br>240 V                             | HP | 5               |
| General use                                | A  | 40              |
| Auxiliary contacts                         |    |                 |
| Pilot Duty                                 |    |                 |
| AC operated                                |    | A600            |
| DC operated                                |    | P300            |
| General Use                                |    |                 |
| AC   | V  | 600             |
| AC   | A  | 10              |
| DC   | V  | 250             |
| DC   | A  | 1               |
| Short Circuit Current Rating               |    |                 |
| Basic Rating                               |    |                 |
| SCCR                                       | kA | 5               |
| max. Fuse                                  | A  | 125             |
| max. CB                                    | A  | 125             |
| 480 V High Fault                           |    |                 |
| SCCR (fuse)                                | kA | 10/100          |
| max. Fuse                                  | A  | 125/70 Class J  |
| SCCR (CB)                                  | kA | 10/65           |
| max. CB                                    | A  | 50/32           |
| 600 V High Fault                           |    |                 |
| SCCR (fuse)                                | kA | 10/100          |
| max. Fuse                                  | A  | 125/125 Class J |
| SCCR (CB)                                  | kA | 10/22           |
| max. CB                                    | A  | 50/32           |
| Special Purpose Ratings                    |    |                 |
| Electrical Discharge Lamps (Ballast)       |    |                 |
| 480V 60Hz 3phase, 277V 60Hz 1phase         | A  | 40              |
| 600V 60Hz 3phase, 347V 60Hz 1phase         | A  | 40              |
| Incandescent Lamps (Tungsten)              |    |                 |
| 480V 60Hz 3phase, 277V 60Hz 1phase         | A  | 40              |
| 600V 60Hz 3phase, 347V 60Hz 1phase         | A  | 40              |
| Resistance Air Heating                     |    |                 |
| 480V 60Hz 3phase, 277V 60Hz 1phase         | A  | 40              |
| 600V 60Hz 3phase, 347V 60Hz 1phase         | A  | 40              |
| Refrigeration Control (CSA only)           |    |                 |

|   |    |      |
|---|----|------|
| LRA 480V 60Hz 3phase                                      | A  | 240  |
| FLA 480V 60Hz 3phase                                      | A  | 40   |
| LRA 600V 60Hz 3phase                                      | A  | 180  |
| FLA 600V 60Hz 3phase                                      | A  | 30   |
| Definite Purpose Ratings (100,000 cycles acc. to UL 1995) |    |      |
| LRA 480V 60Hz 3phase                                      | A  | 192  |
| FLA 480V 60Hz 3phase                                      | A  | 32   |
| Elevator Control  |    |      |
| 200V 60Hz 3phase  | HP | 7.5  |
| 200V 60Hz 3phase  | A  | 25.3 |
| 240V 60Hz 3phase  | HP | 7.5  |
| 240V 60Hz 3phase  | A  | 22   |
| 480V 60Hz 3phase  | HP | 20   |
| 480V 60Hz 3phase  | A  | 27   |
| 600V 60Hz 3phase  | HP | 20   |
| 600V 60Hz 3phase  | A  | 22   |

## Design verification as per IEC/EN 61439

|  |            |    |  |
|--|------------|----|--|
| Technical data for design verification   |            |    |  |
| Rated operational current for specified heat dissipation   | $I_n$      | A  | 32   |
| Heat dissipation per pole, current-dependent   | $P_{vid}$  | W  | 2.2  |
| Equipment heat dissipation, current-dependent  | $P_{vid}$  | W  | 6.6  |
| Static heat dissipation, non-current-dependent   | $P_{vs}$   | W  | 2.1  |
| Heat dissipation capacity  | $P_{diss}$ | W  | 0  |
| Operating ambient temperature min.   |            | °C | -25  |
| Operating ambient temperature max.   |            | °C | 60   |
| IEC/EN 61439 design verification   |            |    |  |
| 10.2 Strength of materials and parts   |            |    |  |
| 10.2.2 Corrosion resistance  |            |    |  |
|  |            |    | Meets the product standard's requirements.   |
| 10.2.3.1 Verification of thermal stability of enclosures   |            |    |  |
|  |            |    | Meets the product standard's requirements.   |
| 10.2.3.2 Verification of resistance of insulating materials to normal heat   |            |    |  |
|  |            |    | Meets the product standard's requirements.   |
| 10.2.3.3 Verification of resistance of insulating materials to abnormal heat and fire due to internal electric effects |            |    |  |
|  |            |    | Meets the product standard's requirements.   |
| 10.2.4 Resistance to ultra-violet (UV) radiation   |            |    |  |
|  |            |    | Meets the product standard's requirements.   |
| 10.2.5 Lifting   |            |    |  |
|  |            |    | Does not apply, since the entire switchgear needs to be evaluated.   |
| 10.2.6 Mechanical impact   |            |    |  |
|  |            |    | Does not apply, since the entire switchgear needs to be evaluated.   |
| 10.2.7 Inscriptions  |            |    |  |
|  |            |    | Meets the product standard's requirements.   |
| 10.3 Degree of protection of ASSEMBLIES  |            |    |  |
|  |            |    | Does not apply, since the entire switchgear needs to be evaluated.   |
| 10.4 Clearances and creepage distances   |            |    |  |
|  |            |    | Meets the product standard's requirements.   |
| 10.5 Protection against electric shock   |            |    |  |
|  |            |    | Does not apply, since the entire switchgear needs to be evaluated.   |
| 10.6 Incorporation of switching devices and components   |            |    |  |
|  |            |    | Does not apply, since the entire switchgear needs to be evaluated.   |
| 10.7 Internal electrical circuits and connections  |            |    |  |
|  |            |    | Is the panel builder's responsibility.   |
| 10.8 Connections for external conductors   |            |    |  |
|  |            |    | Is the panel builder's responsibility.   |
| 10.9 Insulation properties   |            |    |  |
| 10.9.2 Power-frequency electric strength   |            |    |  |
|  |            |    | Is the panel builder's responsibility.   |
| 10.9.3 Impulse withstand voltage   |            |    |  |
|  |            |    | Is the panel builder's responsibility.   |
| 10.9.4 Testing of enclosures made of insulating material   |            |    |  |
|  |            |    | Is the panel builder's responsibility.   |
| 10.10 Temperature rise   |            |    |  |
|  |            |    | The panel builder is responsible for the temperature rise calculation. Eaton will provide heat dissipation data for the devices. |
| 10.11 Short-circuit rating   |            |    |  |
|  |            |    | Is the panel builder's responsibility. The specifications for the switchgear must be observed.                                   |
| 10.12 Electromagnetic compatibility  |            |    |  |
|  |            |    | Is the panel builder's responsibility. The specifications for the switchgear must be observed.                                   |
| 10.13 Mechanical function  |            |    |  |
|  |            |    | The device meets the requirements, provided the information in the instruction leaflet (IL) is observed.                         |

## Technical data ETIM 7.0

|   |    |                  |
|---|----|------------------|
| Low-voltage industrial components (EG000017) / Power contactor, AC switching (EC000066)   |    |                  |
| Electric engineering, automation, process control engineering / Low-voltage switch technology / Contactor (LV) / Power contactor, AC switching (ecl@ss10.0.1-27-37-10-03 [AAB718015]) |    |                  |
| Rated control supply voltage Us at AC 50HZ  | V  | 24 - 24          |
| Rated control supply voltage Us at AC 60HZ  | V  | 0 - 0            |
| Rated control supply voltage Us at DC   | V  | 0 - 0            |
| Voltage type for actuating  |    | AC               |
| Rated operation current Ie at AC-1, 400 V   | A  | 45               |
| Rated operation current Ie at AC-3, 400 V   | A  | 32               |
| Rated operation power at AC-3, 400 V  | kW | 15               |
| Rated operation current Ie at AC-4, 400 V   | A  | 15               |
| Rated operation power at AC-4, 400 V  | kW | 7                |
| Rated operation power NEMA  | kW | 14.9             |
| Modular version   |    | No               |
| Number of auxiliary contacts as normally open contact   |    | 0                |
| Number of auxiliary contacts as normally closed contact   |    | 1                |
| Type of electrical connection of main circuit   |    | Screw connection |
| Number of normally closed contacts as main contact  |    | 0                |
| Number of main contacts as normally open contact  |    | 3                |

## Approvals

|                                      |  |  |
|--------------------------------------|--|--|
| Product Standards                    |  | IEC/EN 60947-4-1; UL 60947-4-1; CSA - C22.2 No. 60947-4-1-14; CE marking |
| UL File No.                          |  | E29096   |
| UL Category Control No.              |  | NLDX   |
| CSA File No.                         |  | 012528   |
| CSA Class No.                        |  | 2411-03, 3211-04   |
| North America Certification          |  | UL listed, CSA certified   |
| Specially designed for North America |  | No   |



- 1: Overload relay
- 2: Suppressor
- 3: Auxiliary contact modules





- Squirrel-cage motor
- Operating characteristics
- Starting: from rest
- Stopping: after attaining full running speed
- Electrical characteristics
- Make: up to 6 x rated motor current
- Break: up to 1 x rated motor current
- Utilization category
- 100 % AC-3
- Typical applications
- Compressors
- Lifts
- Mixers
- Pumps
- Escalators
- Agitators
- Fans
- Conveyor belts
- Centrifuges
- Hinged flaps
- Bucket-elevators
- Air conditioning system
- General drives in manufacturing and processing machines



- Extreme switching duty
- Squirrel-cage motor
- Operating characteristics
- Inching, plugging, reversing
- Electrical characteristics
- Make: up to 6 x rated motor current
- Break: up to 6 x rated motor current
- Utilization category
- 100 % AC-4
- Typical applications
- Printing presses
- Wire-drawing machines
- Centrifuges
- Special drives for manufacturing and processing machines



Switching conditions for non-motor consumers, 3 pole, 4 pole  
 Operating characteristics  
 Non inductive and slightly inductive loads  
 Electrical characteristics  
 Switch on: 1 x rated operational current  
 Switch off: 1 x rated operational current  
 Utilization category  
 100 % AC-1  
 Typical examples of application  
 Electric heat

## Dimensions



Contactor with auxiliary contact module



distance at side to earthed parts: 6 mm

## Additional product information (links)

### IL03407014Z (AWA2100-2127) Contactor

|  |   |
|--|---|
| IL03407014Z (AWA2100-2127) Contactor   | <a href="https://es-assets.eaton.com/DOCUMENTATION/AWA_INSTRUCTIONS/IL03407014Z2020_05.pdf">https://es-assets.eaton.com/DOCUMENTATION/AWA_INSTRUCTIONS/IL03407014Z2020_05.pdf</a>                               |
| Motor starters and "Special Purpose Ratings" for the North American market                   | <a href="http://www.eaton.eu/ecm/groups/public/@pub/@europe/@electrical/documents/content/pct_3258146.pdf">http://www.eaton.eu/ecm/groups/public/@pub/@europe/@electrical/documents/content/pct_3258146.pdf</a> |
| Switchgear of Power Factor Correction Systems  | <a href="http://www.moeller.net/binary/ver_techpapers/ver934en.pdf">http://www.moeller.net/binary/ver_techpapers/ver934en.pdf</a>   |
| X-Start - Modern Switching Installations Efficiently Fitted and Wired Securely               | <a href="http://www.moeller.net/binary/ver_techpapers/ver938en.pdf">http://www.moeller.net/binary/ver_techpapers/ver938en.pdf</a>   |
| Mirror Contacts for Highly-Reliable Information Relating to Safety-Related Control Functions | <a href="http://www.moeller.net/binary/ver_techpapers/ver944en.pdf">http://www.moeller.net/binary/ver_techpapers/ver944en.pdf</a>   |
| Effect of the Cable Capacitance of Long Control Cables on the Actuation of Contactors        | <a href="http://www.moeller.net/binary/ver_techpapers/ver949en.pdf">http://www.moeller.net/binary/ver_techpapers/ver949en.pdf</a>   |
| Switchgear for Luminaires  | <a href="http://www.moeller.net/binary/ver_techpapers/ver955en.pdf">http://www.moeller.net/binary/ver_techpapers/ver955en.pdf</a>   |

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| Standard Compliant and Functionally Safe Engineering Design with Mechanical Auxiliary Contacts | <a href="http://www.moeller.net/binary/ver_techpapers/ver956en.pdf">http://www.moeller.net/binary/ver_techpapers/ver956en.pdf</a> |
| The Interaction of Contactors with PLCs  | <a href="http://www.moeller.net/binary/ver_techpapers/ver957en.pdf">http://www.moeller.net/binary/ver_techpapers/ver957en.pdf</a> |
| Busbar Component Adapters for modern Industrial control panels                                 | <a href="http://www.moeller.net/binary/ver_techpapers/ver960en.pdf">http://www.moeller.net/binary/ver_techpapers/ver960en.pdf</a> |