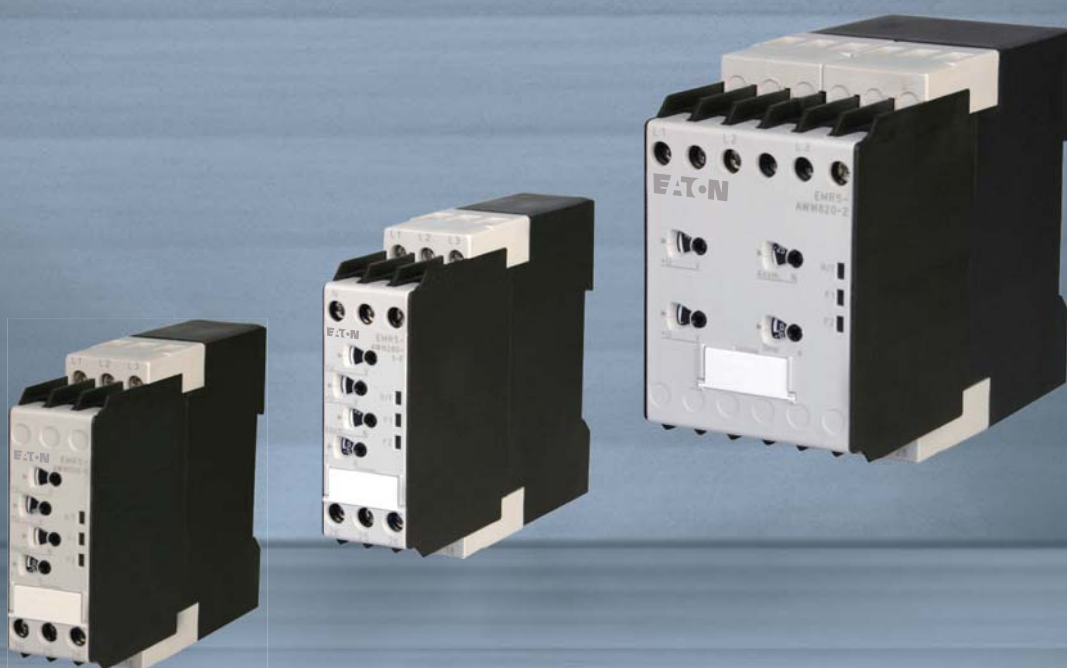


EMR measuring and monitoring relays



EAT•N

The power of fusion.



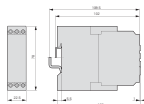
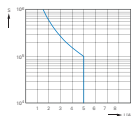
EAT•N

Powering Business Worldwide

There's a certain energy at Eaton. It's the power of uniting some of the world's most respected names to build a brand you can trust to meet every power management need. The energy created supports our commitment to powering business worldwide.

Eaton is dedicated to ensuring that reliable, efficient and safe power is available when it's needed most. With unparalleled knowledge of electrical power management across industries, experts at Eaton deliver customized, integrated solutions to solve our customers' most critical challenges. Eaton.com/Electrical.

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Ordering

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Insulation monitoring relays 16
Phase monitoring relays 18

Dimensions

EMR measuring and monitoring relays 22

Our product range of measurement and monitoring relays has been partially updated.

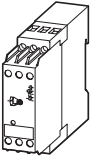
| Old device | Old article no. | New device | New article no. |
|-----------------|-----------------|-----------------|-----------------|
| EMR4-W500-2-C | 221785 | EMR5-W500-1-D | 134221 |
| EMR4-W500-2-D | 221786 | EMR5-W500-1-D | 134221 |
| EMR4-W580-2-D | 221787 | EMR5-AWM720-2 | 134236 |
| EMR4-A400-1 | 221788 | EMR5-A400-1 | 134222 |
| EMR4-AW300-1-C | 290243 | EMR5-AW300-1-C | 134223 |
| EMR4-AW500-1-D | 290244 | EMR5-AW500-1-D | 134224 |
| EMR4-AWN170-1-E | 290245 | EMR5-AWN170-1-E | 134225 |
| EMR4-AWN280-1-F | 290246 | EMR5-AWN280-1-F | 134226 |
| EMR4-W300-1-C | 290182 | EMR5-W300-1-C | 134227 |
| EMR4-W500-1-D | 290183 | EMR5-W500-1-D | 134221 |
| EMR4-W380-1 | 290184 | EMR5-W380-1 | 134228 |
| EMR4-W400-1 | 290185 | EMR5-W400-1 | 134229 |
| EMR4-A300-1-C | 290180 | EMR5-A300-1-C | 134230 |
| EMR4-A500-1-D | 290181 | EMR5-A400-1 | 134222 |

This table provides assistance in replacing EMR4 articles with current EMR5 products.

Electronic relays

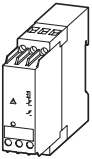
Measuring and monitoring relays

Ordering



Current monitoring relays EMR4-I..., single-phase

| | Current measurement range | Contact sequences | Supply voltage connection | Part no. Article no. | Price See price list | Std. pack |
|---|---|-------------------|---|--|---|-----------|
| | I~/I= A | | | | | |
| Load limit curves → Page 7 | | | | | | |
| Circuit and contact sequence diagrams → Instructional leaflet (AWA) under www.eaton.com | | | | | | |
| <ul style="list-style-type: none"> Switching hysteresis adjustable from 3 - 30 % Response delay 0.1 - 30 s Monitoring of one upper or lower limit Extension of the measurement range possible with current transformers | 3 - 30 mA 10 - 100 mA 0.1 - 1 A 0.3 - 1.5 A 1 - 5 A 3 - 15 A 0.3 - 1.5 A 1 - 5 A 3 - 15 A | | 24 - 240 V AC, 50/60 Hz 24 - 240 V DC 24 - 240 V AC, 50/60 Hz 24 - 240 V DC 220 - 240 V AC, 50/60 Hz | EMR4-I1-1-A 106942 EMR4-I15-1-A 106943 EMR4-I15-1-B 106944 | 1 off 1 off 1 off | |

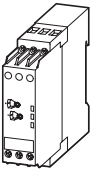
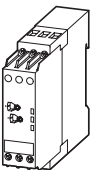


EMR4-F... phase sequence relay

| | Monitoring voltage per phase | Contact sequences | Supply voltage connection | Part no. Article no. | Price See price list | Std. pack |
|---|------------------------------|-------------------|-----------------------------|------------------------------|----------------------|-----------|
| | U_N V AC | | | | | |
| Load limit curves → Page 7 | | | | | | |
| Circuit and contact sequence diagrams → Instructional leaflet (AWA) under www.eaton.com | | | | | | |
| <ul style="list-style-type: none"> Monitors three-phase systems for phase sequence and phase failure ($< 0.6 \times U_e$) Supply voltage connection = monitored voltage | 200 - 500 V AC, 50/60 Hz | | 200 - 500 V AC, 50/60 Hz | EMR4-F500-2 221784 | 1 off | |

EMR5-A... phase imbalance monitoring relays

| | Threshold value | Contact sequences | Supply voltage connection | Part no. Article no. | Price See price list | Std. pack |
|---|---|-------------------|-----------------------------|--------------------------------|----------------------|-----------|
| | | | | | | |
| Load limit curves → Page 7 | | | | | | |
| Circuit and contact sequence diagrams → Instructional leaflet (AWA) under www.eaton.com | | | | | | |
| Power supply from measuring circuit Three-phase monitoring <ul style="list-style-type: none"> Phase sequence Phase failure Asymmetry Imbalance threshold values adjustable 2 - 25 % of mean value of phase voltages On-delay: None = 0 or adjustable from 0.1 to 30 s | Imbalance = 2 - 25 % of phase voltage mean value | | 160 - 300 V AC, 50/60 Hz | EMR5-A300-1-C 134230 | 1 off | |
| Power supply from measuring circuit Three-phase monitoring <ul style="list-style-type: none"> Phase sequence Phase failure Asymmetry Imbalance threshold values adjustable On-delay: None = 0 or adjustable from 0.1 to 30 s | Imbalance = 2 - 25 % of phase voltage mean value | | 300 - 500 V AC, 50/60 Hz | EMR5-A400-1 134222 | 1 off | |

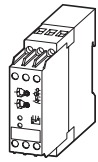


Notes

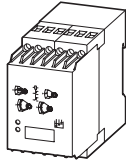
Information relevant for export to North America

| Product Standards | IEC 255-6; UL 508; CSA-22.2 No. 14-05; CE marking |
|----------------------|---|
| UL File No. | E29184 |
| UL CCN | NKCR, NKCR7 |
| CSA File No. | UL report valid |
| CSA Class No. | 3211-03 |
| NA Certification | UL Listed, Certified by UL for use in Canada |
| Degree of Protection | IEC: IP20, UL/CSA Type: - |

Liquid level monitoring relays EMR4-N...

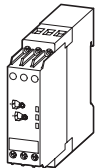


| | Response sensitivity | Contact sequences | Supply voltage connection | Part no. Article no. | Price See price list | Std. pack |
|--|-------------------------------|-------------------|---------------------------|--------------------------------|----------------------|-----------|
| Load limit curves → Page 7 Circuit and contact sequence diagrams → Instructional leaflet (AWA) under www.eaton.com | | | | | | |
| <ul style="list-style-type: none"> • Fill level monitoring of conductive liquids • Mixture ratio monitoring of conductive liquids • Selectable dry-running or overflow protection | 5 k Ω - 100 k Ω | | 220 - 240 V AC, 50/60 Hz | EMR4-N100-1-B 221789 | | 1 off |



| | | | | | | |
|--|-------------------------------|--|--|--------------------------------|--|-----------|
| <ul style="list-style-type: none"> • Fill level monitoring of conductive liquids • Mixture ratio monitoring of conductive liquids • Selectable on-delay or off-delay between 0.5 - 10 s | 250 Ω - 500 k Ω | | 24 - 240 V AC, 50/60 Hz 24 - 240 V DC | EMR4-N500-2-A 221791 | | 1 off |
| | 250 Ω - 500 k Ω | | 220 - 240 V AC, 50/60 Hz | EMR4-N500-2-B 221790 | | 1 off |

Liquid level monitoring relays EMR5N...



| | Response sensitivity | Contact sequences | Supply voltage connection | Part no. Article no. | Price See price list | Std. pack |
|--|-------------------------------|-------------------|---------------------------|-------------------------------|----------------------|-----------|
| Load limit curves → Page 7 Circuit and contact sequence diagrams → Instructional leaflet (AWA) under www.eaton.com | | | | | | |
| <ul style="list-style-type: none"> • Fill level monitoring of conductive liquids • Conductivity (mixture ratio) monitoring of conductive liquids | 5 k Ω - 100 k Ω | | 220 - 240 V AC, 50/60 Hz | EMR5-N80-1-B 134232 | | 1 off |

Notes

Information relevant for export to North America

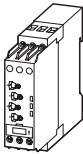
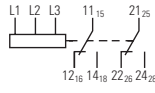




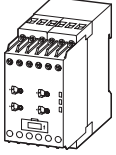




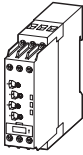
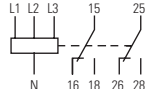




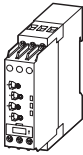






| | |
|----------------------|---|
| Product Standards | IEC 255-6; UL 508; CSA-22.2 No. 14-05; CE marking |
| UL File No. | E29184 |
| UL CCN | NKCR, NKCR7 |
| CSA File No. | UL report valid |
| CSA Class No. | 3211-03 |
| NA Certification | UL Listed, Certified by UL for use in Canada |
| Degree of Protection | IEC: IP20, UL/CSA Type: - |

Electronic relays



Measuring and monitoring relays

Phase monitoring relay EMR5-(A)W...

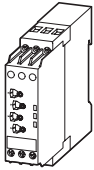
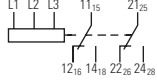


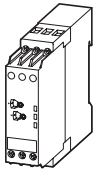
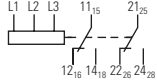


| | Monitoring voltage per phase | Threshold value ¹⁾ | Contact sequences | Supply voltage connection | Width mm | Part no. Article no. | Price See price list | Std. pack |
|---|--|-------------------------------|--|---|----------|----------------------------------|----------------------|--|
| Multifunctional Load limit curves → Page 7 Connections and contact sequence diagrams → Instructional leaflet (AWA) under www.eaton.com | | | | | | | | |
|  | Power supply from measuring circuit | 160 - 300 V AC, 50/60 Hz | U _{max} 220 - 300 V AC U _{min} 160 - 230 V AC |  | 22.5 | EMR5-AW300-1-C 134223 | | 1 off   |
| | Three-phase monitoring | 300 - 500 V AC, 50/60 Hz | U _{max} 420 - 500 V AC U _{min} 300 - 380 V AC | | 22.5 | EMR5-AW500-1-D 134224 | | 1 off   |
|  | <ul style="list-style-type: none"> Phase sequence Phase failure Overvoltage Undervoltage Asymmetry Adjustable threshold values for overvoltage/undervoltage and imbalance On-/Off-delay: None = 0 or adjustable between 0.1 - 30 s | 350 - 580 V AC, 50/60 Hz | U _{max} 480 - 580 V AC U _{min} 350 - 460 V AC | | 45 | EMR5-AWM580-2 134235 | | 1 off   |
| | | 450 - 720 V AC, 50/60 Hz | U _{max} 600 - 720 V AC U _{min} 450 - 570 V AC | | 45 | EMR5-AWM720-2 134236 | | 1 off   |
| | | 530 - 820 V AC, 50/60 Hz | U _{max} 690 - 820 V AC U _{min} 530 - 660 V AC | | 45 | EMR5-AWM820-2 134237 | | 1 off |
| | | | | | | | | |
|  | Power supply from measuring circuit | 90 - 170 V AC, 50/60 Hz | U _{max} 120 - 170 V AC U _{min} 90 - 130 V AC |  | 22.5 | EMR5-AWN170-1-E 134225 | | 1 off   |
| | Three-phase monitoring | 180 - 280 V AC, 50/60 Hz | U _{max} 240 - 280 V AC U _{min} 180 - 220 V AC | | 22.5 | EMR5-AWN280-1 134233 | | 1 off   |
|  | <ul style="list-style-type: none"> Phase sequence Phase failure Overvoltage Undervoltage Asymmetry Neutral cable break (not EMR5-AWN500-1) Adjustable threshold values for overvoltage/undervoltage and imbalance On-/Off-delay: None = 0 or adjustable between 0.1 - 30 s | 180 - 280 V AC, 50/60 Hz | U _{max} 240 - 280 V AC U _{min} 180 - 220 V AC | | 22.5 | EMR5-AWN280-1-F 134226 | | 1 off   |
| | | 300 - 500 V AC, 50/60 Hz | U _{max} 420 - 500 V AC U _{min} 300 - 380 V AC | | 22.5 | EMR5-AWN500-1 134234 | | 1 off   |
| | | | | | | | | |

Notes ¹⁾ Imbalance = 2 - 25% of phase voltage mean value

Information relevant for export to North America


| | | |
|---|----------------------|---|
|   | Product Standards | IEC 255-6; UL 508; CSA-22.2 No. 14-05; CE marking |
| | UL File No. | E29184 |
| | UL CCN | NKCR, NKCR7 |
| | CSA File No. | UL report valid |
| | CSA Class No. | 3211-03 |
| | NA Certification | UL Listed, Certified by UL for use in Canada |
| | Degree of Protection | IEC: IP20, UL/CSA Type: - |

Phase monitoring relay EMR5-(A)W...

| | Monitoring voltage per phase | Threshold value ¹⁾ | Contact sequences | Supply voltage connection | Width mm | Part no. Article no. | Price See price list | Std. pack |
|---|--|-------------------------------|--|---|--------------------------|-------------------------|--------------------------------|--|
| On- and Off-delayed Load limit curves → Page 7 Connections and contact sequence diagrams → Instructional leaflet (AWA) under www.eaton.com | | | | | | | | |
|  | Power supply from measuring circuit | 160 - 300 V AC, 50/60 Hz | U_{max} 220 - 300 V AC U_{min} 160 - 230 V AC |  | 160 - 300 V AC, 50/60 Hz | 22.5 | EMR5-W300-1-C 134227 | 1 off  |
| | Three-phase monitoring of phase parameters | 300 - 500 V AC, 50/60 Hz | U_{max} 420 - 500 V AC U_{min} 300 - 380 V AC | | 300 - 500 V AC, 50/60 Hz | 22.5 | EMR5-W500-1-D 134221 | 1 off  |
|  | Power supply from measuring circuit | 380 V AC, 50/60 Hz | U_{max} 418 V AC U_{min} 342 V AC |  | 380 V, 50/60 Hz | 22.5 | EMR5-W380-1 134228 | 1 off  |
| | Three-phase monitoring of phase parameters | 400 V AC, 50/60 Hz | U_{max} 440 V AC U_{min} 360 V AC | | 400 V, 50/60 Hz | 22.5 | EMR5-W400-1 134229 | 1 off  |

Notes ¹⁾ Imbalance = 2 - 25% of phase voltage mean value

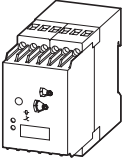
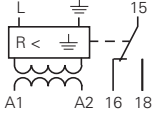

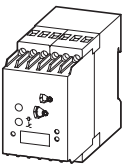
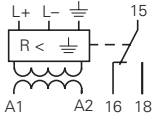

Information relevant for export to North America

| | |
|---|---|
|  | |
| Product Standards | IEC 255-6; UL 508; CSA-22.2 No. 14-05; CE marking |
| UL File No. | E29184 |
| UL CCN | NKCR, NKCR7 |
| CSA File No. | UL report valid |
| CSA Class No. | 3211-03 |
| NA Certification | UL Listed, Certified by UL for use in Canada |
| Degree of Protection | IEC: IP20, UL/CSA Type: - |

Electronic relays

Measuring and monitoring relays, accessories

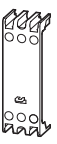
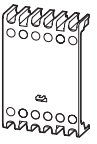
Insulation monitoring relays EMR4-R...

| Description | Insulation resistance range Ω | Contact sequences | Supply voltage connection V AC | Part no. Article no. | Price See price list | Std. pack |
|--|---|---|--|-------------------------------|-------------------------|--|
|  <p>Monitors the insulation resistance between non-grounded AC supply systems and the protective ground conductor Insulation monitoring in 1- and 3-phase AC voltage networks Test via local test button or remote test operation Status display via LED (according to VDE 0413/Part 2) Tripping function memory</p> | 1 - 110 k Ω |  | 24 - 240 V AC, 50/60 Hz 24 - 240 V DC | EMR4-RAC-1-A 221793 | | 1 off  |
|  <p>Monitors the insulation resistance in non-grounded DC supply systems Selector switch for open- or closed-circuit principle Test and reset via local test button or remote test operation Status indication via LEDs</p> | 10 - 110 k Ω |  | 24 - 240 V AC, 50/60 Hz 24 - 240 V DC | EMR4-RDC-1-A 221792 | | 1 off  |

Information relevant for export to North America

|  | |
|---|---|
| Product Standards | IEC 255-6; UL 508; CSA-22.2 No. 14-05; CE marking |
| UL File No. | E29184 |
| UL CCN | NKCR, NKCR7 |
| CSA File No. | 203843 |
| CSA Class No. | 3211-03 |
| NA Certification | UL Listed, CSA Certified |
| Degree of Protection | IEC: IP20, UL/CSA Type: - |

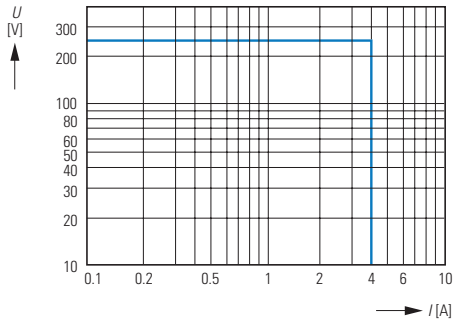
Sealable shroud EMR4-PH...

| | Width mm | Part no. Article no. | Price See price list | Std. pack |
|--|-------------|----------------------------|-------------------------|-----------|
|  | 22.5 | EMR4-PH22 221795 | | 1 off |
|  | 45 | EMR4-PH45 221794 | | 1 off |

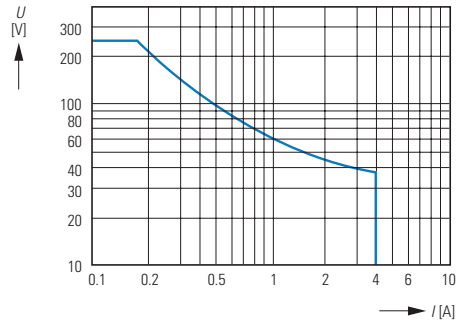
Engineering

Load limit curves, 22.5 mm range

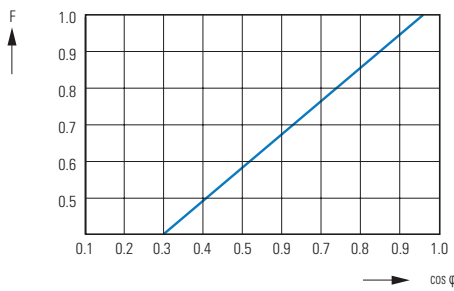
AC load (resistive)



DC load (resistive)

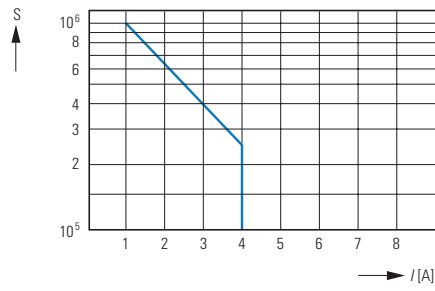


Derating factor with inductive AC load



Derating factor F with inductive load

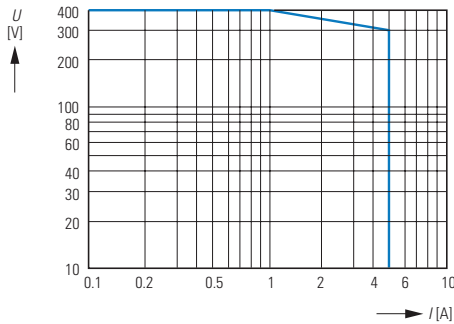
Contact life



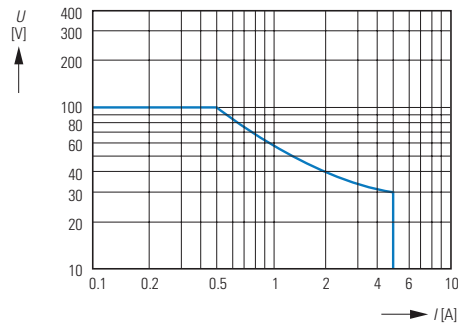
Contact life
Operations S
220 V 50 Hz AC-1
360 operations/h

Load limit curves, 45 mm range

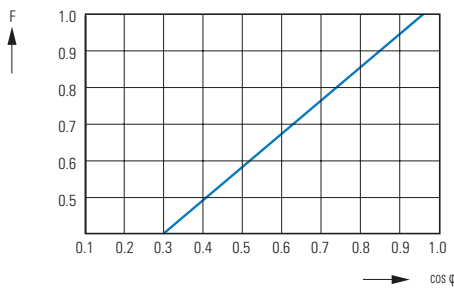
AC load (resistive)



DC load (resistive)

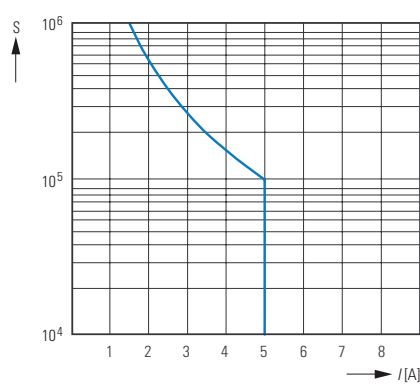


Derating factor with inductive AC load



Derating factor F with inductive load

Contact life



Contact life
Operations S
220 V 50 Hz AC-1
360 operations/h

Electronic relays

Measuring and monitoring relays

Technical data

EMR

| | EMR4-I1-1-A | EMR4-I15-1-A | EMR4-I15-1-B |
|---|--|--|---|
| Input circuit, power supply circuit A1-A2 | | | |
| Rated control voltage U_S - power consumption: | | | |
| A1-A2 | 24 - 240 V AC/DC | 24 - 240 V AC/DC | 220 - 240 V AC |
| Tolerance of rated control voltage U_S | -15 - +10 % | -15 - +10 % | -15 - +10 % |
| Rated frequency | | | |
| AC versions | 50/60 Hz | 50/60 Hz | 50/60 Hz |
| AC/DC versions | 50/60 Hz or DC | 50/60 Hz or DC | 50/60 Hz or DC |
| Current/power consumption | | | |
| 24 V DC | 30 mA/0.75 W | 30 mA/0.75 W | |
| 115 V AC | 24 mA/2.6 VA | 24 mA/2.6 VA | |
| 230 V AC | 11 mA/2.6 VA | 11 mA/2.6 VA | 12 mA/2.6 VA |
| Duty factor (DF) | 100 % | 100 % | 100 % |
| Mains failure buffering | 20 ms | 20 ms | 20 ms |
| Transient overvoltage protection | Varistors | Varistors | Varistors |
| Input circuit measuring circuit B1/B2/B3-C | | | |
| Monitoring functions | Overcurrent or undercurrent monitoring can be configured | Overcurrent or undercurrent monitoring can be configured | Overcurrent and undercurrent monitoring |
| Measurement method | True RMS value measurement, any curve shapes | | |
| Measuring inputs | | | |
| Terminal assignment B1 - C | – | – | – |
| Measurement ranges AC/DC | 3 - 30 mA | 0.3 - 1.5 A | 0.3 - 1.5 A |
| Input resistance | 3.3 Ω | 0.05 Ω | 0.05 Ω |
| Pulse overload capacity $t < 1$ s | 500 mA | 15 A | 15 A |
| Long-term overload | 50 mA | 2 A | 2 A |
| Measuring inputs | | | |
| Terminal assignment B2 - C | – | – | – |
| Measurement ranges AC/DC | 10 - 100 mA | 1 - 5 A | 1 - 5 A |
| Input resistance | 1 Ω | 0.01 Ω | 0.01 Ω |
| Pulse overload capacity $t < 1$ s | 1 A | 50 A | 50 A |
| Long-term overload | 150 mA | 7 A | 7 A |
| Measuring inputs | | | |
| Terminal assignment B3 - C | 0.1 - 1 A | 3 - 15 A | 3 - 15 A |
| Measurement ranges AC/DC | 0.1 Ω | 0.0025 Ω | 0.0025 Ω |
| Input resistance | 10 A | 100 A | 100 A |
| Pulse overload capacity $t < 1$ s | 1.5 A | 17 A | 17 A |
| Long-term overload | – | – | – |
| Threshold value(s) | Adjustable within specified measuring range | | |
| Threshold value setting accuracy | 0.1 | 0.1 | 0.1 |
| Repetition accuracy (constant parameters) | ± 0.07 % of full-scale value | ± 0.07 % of full-scale value | ± 0.07 % of full-scale value |
| Hysteresis relative to threshold value | 3 - 30 % adjustable | 3 - 30 % adjustable | 3 - 30 % adjustable |
| Frequency range of measuring signal | DC/15 Hz - 2 kHz | DC/15 Hz - 2 kHz | DC/15 Hz - 2 kHz |
| Rated frequency range of measuring signal | DC/50 - 60 Hz | DC/50 - 60 Hz | DC/50 - 60 Hz |
| Maximum response time | AC: 80 ms/DC: 120 ms | AC: 80 ms/DC: 120 ms | AC: 80 ms/DC: 120 ms |
| Measuring error within control voltage tolerance | ≤ 0.5 % | ≤ 0.5 % | ≤ 0.5 % |
| Measuring error within temperature range | ≤ 0.06 %/°C | ≤ 0.06 %/°C | ≤ 0.06 %/°C |
| Timing circuits | | | |
| Release delay T_V | 0 or 0.1 - 30 s adjustable | 0 or 0.1 - 30 s adjustable | 0 or 0.1 - 30 s adjustable |
| Repetition accuracy (constant parameters) | None | ± 0.07 % of full-scale value | ± 0.07 % of full-scale value |
| Time error within control voltage tolerance | ≤ 0.5 % | ≤ 0.5 % | ≤ 0.5 % |
| Timeout error within temperature range | ≤ 0.06 %/°C | ≤ 0.06 %/°C | ≤ 0.06 %/°C |
| Operating status indication | | | |
| Control voltage U/T: green LED | Continuous light: control voltage present; slow flashing: trip delay T_V active | | |
| Measured value I: red LED | Continuous light: overcurrent; slow flashing: undercurrent | | |
| Relay status R: yellow LED | Continuous light: relay picked up, no storage Slow flashing: duty factor long: relay picked up, active storage Slow flashing: duty factor short: relay dropped out, active storage | | |
| Output circuits | 11(15) - 12(16)/14(18), 21(25) - 22(26)/24(28) - relays | 11(15) - 12(16)/14(18), 21(25) - 22(26)/24(28) - relays | 11(15) - 12(16)/14(18), 21(25) - 22(26)/24(28) - relays |
| Output type | Two changeover contacts | | |
| Operating principle | Open-circuit principle: Output relays pick up when actual value exceeds or is below set threshold value. | | |

EMR

| | EMR4-I1-1-A | EMR4-I15-1-A | EMR4-I15-1-B |
|---|--|--|--|
| Contact material | AgNi | AgNi | AgNi |
| Rated operating voltage (VDE 0110, IEC 947-1) | 250 V | 250 V | 250 V |
| Minimum switching voltage/minimum switching current | 24 V/10 mA | 24 V/10 mA | 24 V/10 mA |
| Maximum switching voltage/maximum switching current | 250 V AC/4 A AC | 250 V AC/4 A AC | 250 V AC/4 A AC |
| Rated operational current (IEC 60947-5-1) | | | |
| AC12 (resistive) at 230 V | 4 A | 4 A | 4 A |
| AC15 (inductive) at 230 V | 3 A | 3 A | 3 A |
| DC12 (resistive) at 24 V | 4 A | 4 A | 4 A |
| DC13 (inductive) at 24 V | 2 A | 2 A | 2 A |
| Rating data AC (UL 508) | | | |
| Utilization category (Control Circuit Rating Code) | B 300 | B 300 | B 300 |
| Max. rated operational voltage | 300 V AC | 300 V AC | 300 V AC |
| Max. thermal uninterrupted current at B 300 | 5 A | 5 A | 5 A |
| Max. input/output rating (N/O / N/C) for B 300 | 3600/360 VA | 3600/360 VA | 3600/360 VA |
| Mechanical lifespan | 30 x 10 ⁶ operations | 30 x 10 ⁶ operations | 30 x 10 ⁶ operations |
| Electrical lifespan (AC12, 230 V, 4 A) | 0.1 x 10 ⁶ operations | 0.1 x 10 ⁶ operations | 0.1 x 10 ⁶ operations |
| Short-circuit strength/maximum fuse rating | | | |
| Normally closed contact | 6 A fast | 10 A fast | 10 A fast |
| Normally open contact | 6 A fast | 10 A fast | 10 A fast |
| General data | | | |
| Enclosure measurements (w x h x d) | 22.5 x 78 x 100 mm (0.89 x 3.07 x 3.94 inches) | 22.5 x 78 x 100 mm (0.89 x 3.07 x 3.94 inches) | 22.5 x 78 x 100 mm (0.89 x 3.07 x 3.94 inches) |
| Mounting | DIN rail (EN 50022) | DIN rail (EN 50022) | DIN rail (EN 50022) |
| Mounting position | Any | Any | Any |
| Degree of protection of enclosures/terminals | IP50/IP20 | IP50/IP20 | IP50/IP20 |
| Electrical connection | | | |
| Terminal capacities | | | |
| Flexible with/without ferrule | 2 x 0.75 - 2.5 mm ² (2 x 18 - 14 AWG) With measuring currents > 10 A lateral clearance of 10 mm required | | |
| Rigid | 2 x 0.5-4 mm ² (2 x 20-12 AWG) With measuring currents > 10 A lateral clearance of 10 mm required | | |
| Stripped length | 7 mm (0.28 inches) | 7 mm (0.28 inches) | 7 mm (0.28 inches) |
| Tightening torque | 0.6 - 0.8 Nm | 0.6 - 0.8 Nm | 0.6 - 0.8 Nm |
| Environmental data | | | |
| Ambient temperature range (operation/storage) | -20 - +60 °C/-40 - +85 °C | -20 - +60 °C/-40 - +85 °C | -20 - +60 °C/-40 - +85 °C |
| Damp heat (IEC 60068-2-30) | 55 °C, 6 cycles | 55 °C, 6 cycles | 56 °C, 6 cycles |
| Vibration (sinusoidal) (IEC/EN 60255-21-1) | Class 2 | Class 2 | Class 2 |
| Impact (IEC/EN 60255-21-2) | Class 2 | Class 2 | Class 2 |
| Insulation data | | | |
| Rated insulation voltage (VDE 0110, IEC 60947-1, IEC/EN 60255-5) | | | |
| Power supply/measuring circuit/output | 600 V | 600 V | 600 V |
| Power supply/output 1/output 2 | 250 V | 250 V | 250 V |
| Rated impulse withstand voltage U _{imp} (IEC/EN 60947-1, IEC/EN 60255-5) | | | |
| Power supply/measuring circuit/output | 6 kV 1.2/50 μs | 6 kV 1.2/50 μs | 6 kV 1.2/50 μs |
| Power supply/output 1/output 2 | 4 kV 1.2/50 μs | 4 kV 1.2/50 μs | 4 kV 1.2/50 μs |
| Pollution degree (VDE 0110, IEC 664, IEC/EN 60255-5) | 3 | 3 | 3 |
| Overvoltage category (VDE 0110, IEC 664, IEC/EN 60255-5) | III | III | III |
| Directives and standards | | | |
| Product standard | IEC/EN 60255-6 | IEC/EN 60255-6 | IEC/EN 60255-6 |
| Low-Voltage Directive | 2006/95/EC | 2006/95/EC | 2006/95/EC |
| EMC Directive | 2004/108/EC | 2004/108/EC | 2004/108/EC |
| Electromagnetic compatibility | | | |
| Noise immunity | IEC/EN 61000-6-2 | IEC/EN 61000-6-2 | IEC/EN 61000-6-2 |
| Electrostatic discharge (ESD) IEC/EN 61000-4-2 | Level 3 | Level 3 | Level 3 |
| Electromagnetic field (immunity to RF interference) IEC/EN 61000-4-3 | Level 3 | Level 3 | Level 3 |
| Fast transients (burst) IEC/EN 61000-4-4 | Level 3 | Level 3 | Level 3 |
| High-energy pulses (surge) IEC/EN 61000-4-9 | Level 3 | Level 3 | Level 3 |
| Cable-borne HF IEC/EN 61000-4-6 | Level 3 | Level 3 | Level 3 |
| Interference emission | IEC/EN 61000-6-3 | IEC/EN 61000-6-3 | IEC/EN 61000-6-3 |
| Electromagnetic field (immunity to RF interference) IEC/CISPR 22, EN 55022 | Class B | Class B | Class B |
| Cable-borne HF IEC/CISPR 22; EN 55022 | Class B | Class B | Class B |

Electronic relays

Measuring and monitoring relays

EMR

EMR4-F500-2

| Input circuit, measuring circuit | |
|--|---|
| Phase conductor | L1-L2-L3 |
| Rated control voltage U_S | 3 x 200 - 500 V AC |
| Power consumption | Approx. 15 VA |
| Tolerance of rated control voltage U_S | -15 - +10 % |
| Rated frequency | 50/60 Hz |
| Duty factor (DF) | 100% |
| Measuring circuit | |
| Monitoring functions | |
| Phase failure | Yes |
| Phase sequence | Yes |
| Measuring range | 3 x 200 - 500 V AC |
| Threshold value | $0.6 \times U_N$ |
| Frequency of measuring signal | 50/60 Hz |
| Response time | 500 ms |
| Measuring error within rated control voltage tolerance | $\leq 0.5 \%$ |
| Measuring error within temperature range | $\leq 0.06 \%/^{\circ}\text{C}$ |
| Timing circuit | |
| On-delay T_S | Fixed 500 ms |
| Operating status indication | |
| Relay status R: yellow LED | Continuous light: output relay picked up |
| Output circuits | |
| Output circuits | 11(15) -12(16)/14(18), 21(25) -22(26)/24(28) |
| Output type | Two changeover contacts |
| Operating principle | Closed-circuit principle: output relays drop out when value exceeds/below set threshold value |
| Contact material | AgNi |
| Rated operating voltage (VDE 0110, IEC 60947-1) | 250 V |
| Maximum switching voltage | 250 V AC, 250 V DC |
| Rated operational current (IEC 60947-5-1) | |
| AC12 (resistive) at 230 V | 4 A |
| AC15 (inductive) at 230 V | 3 A |
| DC12 (resistive) at 24 V | 4 A |
| DC13 (inductive) at 24 V | 2 A |
| Rating data AC (UL 508) | |
| Utilization category (Control Circuit Rating Code) | B 300 |
| Max. rated operational voltage | 300 V AC |
| Max. thermal uninterrupted current at B 300 | 5 A |
| Max. input/output rating (N/O / N/C) for B 300 | 3600/360 VA |
| Mechanical lifespan | 30×10^6 operations |
| Electrical lifespan (AC12, 230 V, 4 A) | 0.1×10^6 operations |
| Short-circuit strength/maximum fuse rating | |
| Normally closed contact | 4 A fast |
| Normally open contact | 6 A fast |
| General data | |
| Enclosure measurements (w x h x d) | 22.5 x 78 x 100 mm (0.89 x 3.07 x 3.94 inches) |
| Mounting position | Any |
| Degree of protection of enclosures/terminals | IP50/IP20 |
| Mounting | DIN rail (EN 50022) |
| Electrical connection | |
| Terminal capacities | |
| Flexible with ferrule | 2 x 0.75- 2.5 mm ² (2 x 18 - 14 AWG) |
| Flexible without ferrule | 2 x 0.75- 2.5 mm ² (2 x 18 - 14 AWG) |
| Rigid | 2 x 0.5 - 4 mm ² (2 x 20 - 12 AWG) |
| Stripped length | 7 mm (0.28 inches) |
| Tightening torque | 0.6 - 0.8 Nm |

EMR

EMR4-F500-2

Environmental data

| | |
|--|------------------------------------|
| Ambient temperature range, operation/storage | -20 - +60 °C / -40 - +85 °C |
| Climatic testing (IEC 68-2-30) | 24 h cycle, 55 °C, 93 % rel., 96 h |
| Operating safety (IEC 68-2-6) | 4 g |
| Mechanical strength (IEC 68-2-6) | 6 g |

Insulation data

| | |
|--|-----------------------|
| Rated voltage between supply, measuring, and output circuits (VDE 0110, IEC 60947-1) | 500V |
| Rated impulse withstand voltage U_{imp} between all insulated circuits (VDE 0110, IEC 664) | 2.5 kV, 50 Hz, 1 min. |
| Test voltage between all insulated circuits (routine test) | 4 kV, 50 Hz, 1 min. |
| Pollution degree (VDE 0110, IEC 664, IEC 255-5) | 3 |
| Overvoltage category (VDE 0110, IEC 664, IEC 255-5) | III |

Directives and standards

| | |
|-----------------------|-----------------------|
| Product standard | IEC 255-6, EN 60255-6 |
| Low-Voltage Directive | 2006/95/EC |
| EMC Directive | 2004/108/EC |

Electromagnetic compatibility

| | |
|--|----------------------|
| Noise immunity | EN 61000-6-2 |
| Electrostatic discharge (ESD) IEC/EN 61000-4-2 | Level 3 (6 kV/8 kV) |
| Electromagnetic field (immunity to RF interference) IEC/EN 61000-4-3 | Level 3 (10 V/m) |
| Fast transients (burst) IEC/EN 61000-4-4 | Level 3 (2 kV/5 kHz) |
| High-energy pulses (surge) IEC 1000-4-5, EN 61000-4-5 | Level 4 (2 kV L-L) |
| Cable-borne HF IEC 100-4-6, EN 61000-4-6 | Level 3 (10 V) |
| Interference emission | EN 61000-6-4 |

Electronic relays

Measuring and monitoring relays

EMR

| | unit | EMR5-A300-1-C | EMR5-A400-1 |
|--|------------|---|---|
| Input circuit, measuring circuit | | | |
| Rated control voltage, monitored voltage | U_s | L1,L2,L3 3 x 160 - 300 V AC | L1,L2,L3 3 x 300 - 500 V AC |
| Typical current/power consumption | | 25 mA/10 VA/230 V AC | 25 mA/18 VA/400 V AC |
| Rated control voltage tolerance | U_s | % -15 - +10 | -15 - +10 |
| Rated frequency | Hz | 50/60 | 50/60 |
| Frequency range | Hz | 45 - 65 | 45 - 65 |
| Measuring circuit | | | |
| Monitoring functions | | | |
| Phase failure | | Yes | Yes |
| Phase sequence | | Yes | Yes |
| Automatic phase sequence correction | | No | No |
| Asymmetry | | Yes | Yes |
| Overvoltage/undervoltage | | No | No |
| Neutral conductor | | No | No |
| Measuring range | | | |
| Overvoltage | | No | No |
| Undervoltage | | No | No |
| Asymmetry | | 2 - 25 % of phase voltage mean value | |
| Adjustable threshold values | | | |
| Overvoltage | | No | No |
| Undervoltage | | No | No |
| Imbalance (disconnection value) | | Adjustable within measuring range | Adjustable within measuring range |
| Hysteresis relative to threshold value | | | |
| Overvoltage/undervoltage | | No | No |
| Asymmetry | | Fixed 20 % | Fixed 20 % |
| Rated frequency of measuring signal | Hz | 50/60 | 50/60 |
| Frequency range of measuring signal | Hz | 45 - 65 | 45 - 65 |
| Maximum monitoring cycle | ms | 100 | 100 |
| Measuring error within rated control voltage tolerance | | | |
| Measuring error within temperature range | | | |
| Measurement method | | True RMS value measurement | True RMS value measurement |
| Timing circuit | | | |
| On-delay | T_s | ms Fixed 200 | ms Fixed 200 |
| Response delay | T_v | s On-delayed: none = 0; adjustable 0.1 - 30 | s On-delayed: none = 0; adjustable 0.1 - 30 |
| Timeout error within rated control voltage tolerance | % | ≤ 0.5 | ≤ 0.5 |
| Timeout error within temperature range | % /°C | ≤ 0.06 | ≤ 0.06 |
| Repetition accuracy (constant parameters) | % | $< \pm 0.2$ | $< \pm 0.2$ |
| Operating status indication | | | |
| Relay status R: yellow LED | | See instructional leaflet | See instructional leaflet |
| Output circuits | | | |
| Output circuits | | 15-16/18, 25-26/28 | 15-16/18, 25-26/28 |
| Output type | | 2 x 1 relay (changeover contact) | 2 x 1 relay (changeover contact) |
| Operating principle | | Closed-circuit principle: output relays drop out when value above/below set threshold value | |
| Contact material | | AgNi alloy, Cd-free | AgNi alloy, Cd-free |
| Rated operating voltage (VDE 0110, IEC 60947-1) | V | 250 | 250 |
| Minimum switching voltage/minimum switching current | No | 24 V/10 mA | 24 V/10 mA |
| Minimum switching duty | V/mA | 24/10 | 24/10 |
| Maximum switching voltage | | → Page 7 | → Page 7 |
| Rated operational current (IEC 60947-5-1) | | | |
| AC12 (resistive) at 230 V | A | 4 | 4 |
| AC15 (inductive) at 230 V | A | 3 | 3 |
| DC12 (resistive) at 24 V | A | 4 | 4 |
| DC13 (inductive) at 24 V | A | 2 | 2 |
| Rating data AC (UL 508) | | | |
| Utilization category (Control Circuit Rating Code) | | B 300 | B 300 |
| Max. rated operational voltage | V AC | 300 | 300 |
| Max. thermal uninterrupted current at B 300 | A | 5 | 5 |
| Max. input/output rating (N/O / N/C) for B 300 | VA | 3600/360 | 3600/360 |
| Mechanical lifespan | Operations | 30×10^6 | 30×10^6 |
| Electrical lifespan (AC12, 230 V, 4 A) | Operations | 0.1×10^6 | 0.1×10^6 |

EMR

| | unit | EMR5-A300-1-C | EMR5-A400-1 |
|---|-----------------------|---|--------------------------------------|
| Short-circuit strength/maximum fuse rating | | | |
| Normally closed contact | | 6 A fast | 6 A fast |
| Normally open contact | | 10 A fast | 10 A fast |
| General data | | | |
| Enclosure measurements (w x h x d) | mm (inch) | 22.5 x 78 x 100 (0.89 x 3.07 x 3.94) | 22.5 x 78 x 100 (0.89 x 3.07 x 3.94) |
| Mounting position | | Any | |
| Degree of protection of enclosures/terminals | | IP50/IP20 | |
| Mounting | | DIN rail (EN 60715), clip-type toolless | |
| Minimum distance to adjacent devices | | | |
| Horizontal (min. 10 mm of continuous voltage) | V | > 220 | > 400 |
| Vertical | | None | None |
| Electrical connection | | | |
| Terminal capacities | | | |
| Flexible with ferrule | mm ² (AWG) | 2 x 0.75-2.5 (2 x 18 - 14) | 2 x 0.75-2.5 (2 x 18 - 14) |
| Flexible without ferrule | mm ² (AWG) | 2 x 0.75-2.5 (2 x 18 - 14) | 2 x 0.75-2.5 (2 x 18 - 14) |
| Rigid | mm ² (AWG) | 2 x 0.5-4 (2 x 20 - 12) | 2 x 0.5-4 (2 x 20 - 12) |
| Stripped length | mm (inch) | 7 (0.28) | 7 (0.28) |
| Tightening torque | Nm | 0.6 - 0.8 | 0.6 - 0.8 |
| Environmental data | | | |
| Ambient temperature range, operation/storage | °C | -25 - +60/-40 - +85 | -25 - +60 /-40 - +85 |
| Damp heat (IEC 60068-2-30) | | 55 °C, 6 cycles | 55 °C, 6 cycles |
| Climate class | | 3K3 | 3K3 |
| Vibration (sinusoidal) (IEC/EN 60255-21-1) | Class | 2 | 2 |
| Impact (IEC/EN 60255-21-2) | Class | 2 | 2 |
| Insulation data | | | |
| Rated voltage between supply, measuring, and output circuits (VDE 0110, IEC 60947-1) | | | |
| Rated impulse withstand voltage U _{imp} between all insulated circuits (VDE 0110, IEC 664) | | | |
| Rated insulation voltage U _i | | | |
| Input circuit/output circuit | V | 600 | 600 |
| Input circuit 1/output circuit 2 | V | 300 | 300 |
| Rated impulse withstand voltage U _{imp} (VDE 0110, IEC/EN 60664) | | | |
| Input circuit | | 6 kV; 1.2/50 μs | 6 kV; 1.2/50 μs |
| Output circuits | | 4 kV; 1.2/50 μs | 4 kV; 1.2/50 μs |
| Test voltage between all insulated circuits (routine test) | | 2.5 kV, 50 Hz, 1 s | 2.5 kV, 50 Hz, 1 s |
| Basic insulation, input circuit/output circuit | V | 600 | 600 |
| Safe isolation (VDE 0160 Part 101 and 101/A; IEC/EN 61140) input circuit/output circuit | | No | No |
| Pollution degree (VDE 0110, IEC/EN 60664, UL 508) | | 3 | 3 |
| Overvoltage category (VDE 0110, IEC 60664, UL 508) | | III | III |
| Directives/Standards | | | |
| Product standard | | IEC/EN 60255-6, EN 50178 | IEC/EN 60255-6, EN 50178 |
| Low-Voltage Directive | | 2006/95/EC | 2006/95/EC |
| EMC Directive | | 2004/108/EC | 2004/108/EC |
| RoHS Directive | | 2002/95/EC | 2002/95/EC |
| Electromagnetic compatibility | | | |
| Noise immunity | | EN 61000-6-1, EN 61000-6-2 | EN 61000-6-1, EN 61000-6-2 |
| Electrostatic discharge (ESD) IEC/EN 61000-4-2 | Level | 3 (6 kV/8 kV) | 3 (6 kV/8 kV) |
| Electromagnetic field (immunity to RF interference) IEC/EN 61000-4-3 | Level | 3 (10 V/m) | 3 (10 V/m) |
| Fast transients (burst) IEC/EN 61000-4-4 | Level | 3 (2 kV/2 kHz) | 3 (2 kV/2 kHz) |
| High-energy pulses (surge) IEC 1000-4-5, EN 61000-4-5 | Level | 4 (2 kV L-L) | 4 (2 kV L-L) |
| Cable-borne HF IEC 100-4-6, EN 61000-4-6 | Level | 3 (10 V) | 3 (10 V) |
| Resistance to harmonics EN 61000-4-13 | Class | 3 | 3 |
| Interference emission | | EN 61000-6-3, EN 61000-6-4 | EN 61000-6-3, EN 61000-6-4 |
| Electromagnetic field (immunity to RF interference) IEC/CISPR 22, EN 50022 | Class | B | B |
| Cable-borne HF | Class | B | B |

Electronic relays

Measuring and monitoring relays

EMR

| | EMR5-N080-1-B | EMR4-N100-1-B | EMR4-N500-2-B | EMR4-N500-2-A |
|---|--|--|--|--|
| Input circuit | | | | |
| Rated control voltage | | | | |
| U _S - power consumption: | | | | |
| A1 - A2 | 220 - 240 V AC approx. 1.5 VA | 220 - 240 V AC approx. 4 VA | 220 - 240 V AC approx. 3 VA | 24 - 240 V AC/DC approx. 2 VA/W |
| Tolerance of rated control voltage U _S | -15 % - 10 % | -15 % - 10 % | -15 % - +10 % | -15 % - +10 % |
| Rated frequency | 50 - 60 Hz | 50 - 60 Hz | 50 - 60 Hz or DC | 50 - 60 Hz or DC |
| Duty factor (DF) | 100 % | 100 % | 100 % | 100 % |
| Measuring circuit | | | | |
| Monitoring functions | MAX-MIN-C | MAX-MIN-C | MAX-MIN-C | MAX-MIN-C |
| Response sensitivity | Level control | Level control | Level control | Level control |
| Response sensitivity | 5 - 100 kΩ, adjustable | 5 - 100 kΩ, adjustable | 250 Ω - 5 kΩ, adjustable | 250 Ω - 5 kΩ, adjustable |
| Maximum electrode voltage | 30 V AC | 30 V AC | 20 V AC | 20 V AC |
| Maximum electrode current | 1 mA | 1 mA | 8 mA | 8 mA |
| Electrode supply cable | | | | |
| Cable capacity max. | 10 nF | 10 nF | 200 nF | 200 nF |
| Cable length max. | 100 m | 100 m | 1000 m | 1000 m |
| Response sensitivity | | | 2.5-50 kΩ, adjustable | 2.5-50 kΩ, adjustable |
| Maximum electrode voltage | | | 20 V AC | 20 V AC |
| Maximum electrode current | | | 2 mA | 2 mA |
| Electrode supply cable | | | | |
| Cable capacity max. | | | 20 nF | 20 nF |
| Cable length max. | | | 100 m | 100 m |
| Response sensitivity | | | 25 - 500 kΩ, adjustable | 25 - 500 kΩ, adjustable |
| Maximum electrode voltage | | | 20 V AC | 20 V AC |
| Maximum electrode current | | | 0.5 mA | 0.5 mA |
| Electrode supply cable | | | | |
| Cable capacity max. | | | 4 nF | 4 nF |
| Cable length max. | | | 20 m | 20 m |
| Timing circuit | | | | |
| Release delay | Approx. 250 ms | Approx. 250 ms | | |
| Delay time | | | 0.1 - 10 s, adjustable, on-delay without off-delay | 0.1 - 10 s, adjustable, on-delay without off-delay |
| Operating status indication | | | | |
| Control voltage | U: green LED | U: green LED | U: green LED | U: green LED |
| Output relay energized | R MAX/MIN: yellow LED | | | |
| Alarm relay AL1 | – | R AL1: yellow LED | U: green LED | U: green LED |
| Alarm relay AL2 | – | R AL2: yellow LED | R: yellow LED | R: yellow LED |
| Output circuits | | | | |
| Output circuits | 11-12/14, 21-22, 31-32 | 11-12/14, 21-22, 31-32 | 15-16/18, 25-26/28 | 15-16/18, 25-26/28 |
| Output type | 1 changeover contact, 1 normally closed contact + 1 normally open contact | 1 changeover contact, 1 normally closed contact + 1 normally open contact | Two changeover contacts | Two changeover contacts |
| Operating principle | Live current principle ¹⁾ | Open ⁻¹⁾ and closed-circuit principle ²⁾ | Live current principle ¹⁾ | Live current principle ¹⁾ |
| Contact material | AgCdO | AgCdO | AgCdO | AgCdO |
| Rated voltage (VDE 0110, IEC 60947-1) | 250 V | 250 V | 400 V | 400 V |
| Maximum switching voltage | 250 V | 250 V | 400 V | 400 V |
| Rated operational current (IEC 60947-5-1) | | | | |
| AC12 (resistive) 230 V | 4 A | 4 A | 5 A | 5 A |
| AC15 (inductive) 230 V | 3 A | 3 A | 3 A | 3 A |
| DC12 (resistive) 24 V | 4 A | 4 A | 5 A | 5 A |
| DC13 (inductive) 24 V | 2 A | 2 A | 2 A | 2 A |

Notes

¹⁾ Output relays pick up when value above/below set threshold value

²⁾ Output relays drop out when value above/below set threshold value

EMR

| | EMR5-N080-1-B | EMR4-N100-1-B | EMR4-N500-2-B | EMR4-N500-2-A |
|--|--|--|--|--|
| Rated operational data AC (UL 508) | | | | |
| Utilization category (Control Circuit Rating Code) | B 300 | B 300 | B 300 | B 300 |
| Max. rated operational voltage | 300 V AC | | 300 V AC | 300 V AC |
| Max. thermal uninterupted current at B 300 | 5 A | 5 A | 5A | 5A |
| Max. input/output rating (N/O / N/C) for B 300 | 3600/360 VA | 3600/360 VA | 3600/360 VA | 3600/360 VA |
| Mechanical lifespan | 30 x 10 ⁶ operations | 30 x 10 ⁶ operations | 30 x 10 ⁶ operations | 30 x 10 ⁶ operations |
| Electrical lifespan (AC12, 230 V, 4 A) | 0.3 x 10 ⁶ operations | 0.3 x 10 ⁶ operations | 0.1 x 10 ⁶ operations | 0.1 x 10 ⁶ operations |
| Short-circuit rating, max. fuse rating, N/C / N/O contact | 10 A fast/10 A fast | 10 A fast/10 A fast | 4 A fast/6 A fast | 4 A fast/6 A fast |
| General data | | | | |
| Enclosure measurements (w x h x d) | 22.5 x 70 x 100 mm (0.89 x 3.07 x 3.94 in) | 22.5 x 70 x 100 mm (0.89 x 3.07 x 3.94 in) | 45 x 78 x 100 mm (1.77 x 3.07 x 3.94 in) | 45 x 78 x 100 mm (1.77 x 3.07 x 3.94 in) |
| Mounting position | Any | Any | Any | Any |
| Degree of protection of enclosures/terminals | IP50/IP20 | IP50/IP20 | IP50/IP20 | IP50/IP20 |
| Ambient temperature range, operation/storage | -20 - +60 °C / -40 - +85 °C | -20 - +60 °C / -40 - +85 °C | -25 - +65°C / -40 - 85°C | -25 - +65°C / -40 - 85°C |
| Mounting | DIN rail (EN 50022) | DIN rail (EN 50022) | DIN rail (EN 50022) | DIN rail (EN 50022) |
| Electrical connection | | | | |
| Terminal capacity | | | | |
| Flexible with ferrule | 2 x 2.5 mm ² (2 x 14 AWG) | 2 x 2.5 mm ² (2 x 14 AWG) | 2 x 2.5 mm ² (2 x 14 AWG) | 2 x 2.5 mm ² (2 x 14 AWG) |
| Directives and standards | | | | |
| Product standard | IEC 255 - 6, EN 60255-6 | IEC 255 - 6, EN 60255-6 | IEC 255-6, EN 60255-6 | IEC 255-6, EN 60255-6 |
| Low-Voltage Directive | 2006/95/EC | 2006/95/EC | 2006/95/EC | 2006/95/EC |
| EMC Directive | 2004/108/EC | 2004/108/EC | 2004/108/EC | 2004/108/EC |
| Electromagnetic compatibility (EMC) | No | No | No | No |
| Electrostatic discharge (ESD) IEC/EN 61000-4-2 | Level 3 (6 kV/8 kV) | Level 3 (6 kV/8 kV) | Level 3 (6 kV/8kV) | Level 3 (6 kV/8kV) |
| Electromagnetic field (immunity to RF interference) IEC/EN 61000-4-3 | Level 3 (10 V/m) | Level 3 (10 V/m) | Level 3 (10 V/m) | Level 3 (10 V/m) |
| Fast transients (burst) IEC/EN 61000-4-4 | Level 3 (2 kV/5 kHz) | Level 3 (2 kV/5 kHz) | Level 3 (2 kV/5 kHz) | Level 3 (2 kV/5 kHz) |
| High-energy pulses (surge) IEC1000-4-5, EN 61000-4-5 | Level 4 (2 kV L-L) | Level 4 (2 kV L-L) | Level 4 (2 kV L-L) | Level 4 (2 kV L-L) |
| Immunity to line-conducted interference, IEC 1000-4-6, IEC 1000-4-6, EN 61000-4-6 | Level 3 (10 V) | Level 3 (10 V) | Level 3 (10 V) | Level 3 (10 V) |
| Operating safety (IEC 68-2-6) | 4 g | 4 g | 5 g | 5 g |
| Mechanical strength (IEC 68-2-6) | 6 g | 6 g | 10 g | 10 g |
| Insulation data | | | | |
| Rated voltage between supply, measuring, and output circuits (VDE 0110, IEC 60947-1) | 250 V | 250 V | 500 V | 500 V |
| Rated impulse withstand voltage between all insulated circuits(VDE 0110, IEC 664) | 4 kV/1.2 - 50 μs | 4 kV / 1.2 - 50 μs | 4 kV/1.2 - 50 μs | 4 kV/1.2 - 50 μs |
| Test voltage between all insulated circuits | 2.5 kV, 50 Hz, 1 min. | 2.5 kV, 50 Hz, 1 min. | 2.5 kV, 50 Hz, 1 min. | 2.5 kV, 50 Hz, 1 min. |
| Pollution degree (VDE 0110, IEC 664, IEC 255-5) | 3/C | 3/C | 3/C | 3/C |
| Overvoltage category (VDE 0110, IEC 664, IEC 255-5) | III/C | III/C | III/C | III/C |
| Climatic testing (IEC 68-2-30) | 24 h cycle, 55 °C, 93 % rel., 96 h | 24 h cycle, 55 °C, 93 % rel., 96 h | 24 h cycle, 55 °C, 93 % rel., 96 h | 24 h cycle, 55 °C, 93 % rel., 96 h |

Electronic relays

Measuring and monitoring relays

EMR

| | EMR4-RDC-1-A | EMR4-RAC-1-A |
|---|--|---|
| Input circuit | | |
| Rated control voltage U_S power consumption: | | |
| A1-B2 | 24 - 240 V AC/DC - approx. 8 VA / 2 W | 24 - 240 V AC/DC - approx. 8 VA / 2 W |
| Tolerance of rated control voltage U_S | -15 % - +10 % | -15 % - +10 % |
| Rated frequency | | |
| AC/DC versions | 15 - 400 Hz or DC | 15 - 400 Hz or DC |
| AC versions | – | 50 - 60 Hz |
| Duty factor (DF) | 100 % | 100 % |
| Measuring circuit L-PE | | |
| Monitoring function, insulation monitoring for isolated AC networks | Isolated DC networks | |
| Measuring range, threshold value setting range min-max. | 10 - 110 k Ω | 1 - 11 k Ω , 10 - 110 k Ω |
| Minimum internal resistance | – | 57 k Ω |
| Minimum internal AC resistance | – | 100 k Ω |
| Internal DC resistance | – | 100 k Ω |
| Test resistance | – | 820 |
| Max. voltage at measuring input | 300 V DC | 415 V AC |
| Max. DC measuring voltage | 24 - 240 V DC | 30 V DC |
| Max. cable length for clear-test button | | 10 m |
| Time delay | < 1 s with insulation, < 0.9 x response value | Proportional to insulation resistance and dependent on set threshold value |
| Operating status indication | | |
| Control voltage | U: green LED | U: green LED |
| Insulation fault | L+: red LED, L-: red LED | F: red LED |
| Output circuits | | |
| Output circuits | 15-16/18 | 15-16/18 |
| Output type | One changeover contact | One changeover contact |
| Operating principle | Open-circuit principle: Output relays pick up when value above/ below set threshold value Closed-circuit principle: output relays drop out when value above/below set threshold value | Open-circuit principle: Output relays pick up when value above/below set threshold value |
| Contact material | AgCdO | AgCdO |
| Rated operating voltage (VDE 0110, IEC 664-1, IEC 60947-1) | 250 V | 250 V |
| Maximum switching voltage | 400 V AC, 300 V DC | 400 V AC, 300 V DC |
| Rated operational current (IEC 60947-5-1, EN 60947-5-1) | | |
| AC12 (resistive) 230 V | 5A | 5A |
| AC15 (inductive) 230 V | 3A | 3A |
| DC12 (resistive) 24 V | 5A | 5A |
| DC13 (inductive) 24 V | 2A | 2A |
| Rated operational data AC (UL 508) | | |
| Utilization category (Control Circuit Rating Code) | B300 | B300 |
| Max. rated operational voltage | 300 V AC | 300 V AC |
| Max. thermal uninterrupted current at B 300 | 5A | 5A |
| Max. input/output rating (N/O / N/C) for B 300 | 3600/360 VA | 3600/360 VA |
| Mechanical lifespan | 30 x 10 ⁶ operations | 30 x 10 ⁶ operations |
| Electrical lifespan (AC12, 230 V, 4 A) | 0.1 x 10 ⁶ operations | 0.1 x 10 ⁶ operations |
| Short-circuit rating, max. fuse protection, N/C / N/O contact | 4 A fast/6 A fast | 4 A fast/6 A fast |

EMR

| | EMR4-RDC-1-A | EMR4-RAC-1-A |
|--|--|--|
| General data | | |
| Enclosure measurements | 45 x 78 x 100 mm (1.77 x 3.07 x 3.94 in) | 45 x 78 x 100 mm (1.77 x 3.07 x 3.94 in) |
| Weight | approx. 0.3 kg (0.66 lb) | approx. 0.3 kg (0.66 lb) |
| Mounting position | Any | Any |
| Degree of protection of enclosures/terminals | IP50/IP20 | IP50/IP20 |
| Ambient temperature range, operation/storage | -25 - +65 °C / -40 - +85 °C | -25 - +65 °C / -40 - +85 °C |
| Mounting | DIN rail (EN 50022) | DIN rail (EN 50022) |
| Electrical connection | | |
| Terminal capacity | | |
| Flexible with ferrule | 2 x 2.5 mm ² (2 x 14 AWG) | 2 x 2.5 mm ² (2 x 14 AWG) |
| Directives and standards | | |
| Product standard | IEC 255-6, EN 60255-6 | IEC 255-6, EN 60255-6 |
| Low-Voltage Directive | 2006/95/EC | 2006/95/EC |
| EMC Directive | 2004/108/EC, 91/263/EEC, 92/31/EEC, 93/68/EEC, 93/67/EEC | 2004/108/EC, 91/263/EEC, 92/31/EEC, 93/68/EEC, 93/67/EEC |
| Electromagnetic compatibility (EMC) | EN 61000-6-2, EN 61000-6-4 | EN 61000-6-2, EN 61000-6-4 |
| Electrostatic discharge (ESD) IEC/EN 61000-4-2 | Level 3 (6 kV/8 kV) | Level 3 (6 kV/8 kV) |
| Electromagnetic field (immunity to RF interference) IEC/EN 61000-4-3 | Level 3 (10(3)V/m) | Level 3 (10(3)V/m) |
| Fast transients (burst) IEC/EN 61000-4-4 | Level 3 (2(1) kV/5 kHz) | Level 3 (2(1) kV/5 kHz) |
| High-energy pulses (surge) IEC 1000-4-5, EN 61000-4-5 | Level 3 (2(1) kV L-L) | Level 3 (2(1) kV L-L) |
| Immunity to line-conducted interference, IEC 1000-4-6, EN 61000-4-6 | Level 3 (10(3) V) | Level 3 (10(3) V) |
| Operating safety (IEC 68-2-6) | 5 g | 5 g |
| Mechanical strength (IEC 68-2-6) | 10 g | 10 g |
| Climatic testing (IEC 68-2-30) | 24 h cycle, 55 °C, 93 % rel., 96 h | 24 h cycle, 55 °C, 93 % rel., 96 h |
| Insulation data | | |
| Rating (HD 625.1 S1, VDE 0110, IEC 664-1, IEC 60255-5) | | |
| Rated voltage between supply, measuring, and output circuits | 250 V | 250 V |
| Rated impulse withstand voltage between all insulated circuits | 4 kV / 1.2 - 50 μs | 4 kV / 1.2 - 50 μs |
| Test voltage between all insulated circuits | 2.5 kV, 50 Hz, 1 min. | 2.5 kV, 50 Hz, 1 min. |
| Pollution degree | 3 | 3 |
| Overvoltage category | III | III |

Electronic relays

Measuring and monitoring relays

EMR

| | EMR5-W300-1-C | EMR5-W380-1 | EMR5-W400-1 | EMR5-W500-1-D | EMR5-AW300-1-C |
|--|--|--|--|--|---|
| Input circuit, measuring circuit | | | | | |
| Main pole, neutral conductor | L1,L2,L3 | L1,L2,L3 | L1,L2,L3 | L1,L2,L3 | L1, L2, L3 |
| Rated control voltage U_S = monitored voltage | 3 x 160 - 300 V AC | 3 x 380 V AC | 3 x 400 V AC | 3 x 300 - 500 V AC | 3 x 160 - 300 V AC |
| Tolerance of rated control voltage U_S | -15 - +10 % | -15 - +10 % | -15 - +10 % | -15 - +10 % | -15 - +10 % |
| Rated frequency | 50/60 Hz | 50/60 Hz | 50/60 Hz | 50/60 Hz | 50/60 Hz |
| Frequency range | 45 - 65 Hz | 45 - 65 Hz | 45 - 65 Hz | 45 - 65 Hz | 45 - 65 Hz |
| Typical current/power consumption | 25 mA/10 VA /at 250 V AC | 25 mA/18 VA /at 380 V AC | 25 mA/18 VA /at 400 V AC | 25 mA/18 VA /at 400 V AC | 25 mA/10 VA (230 V AC) |
| Duty factor (DF) | | | | | |
| Measuring circuit | | | | | |
| Monitoring functions | | | | | |
| Phase failure | Yes | Yes | Yes | Yes | Yes |
| Phase sequence | Can be deactivated | Can be deactivated | Can be deactivated | Can be deactivated | Can be deactivated |
| Automatic phase sequence correction | No | No | No | No | No |
| Asymmetry | No | No | No | No | Yes |
| Overvoltage/undervoltage | Yes | Yes | Yes | Yes | Yes |
| Neutral conductor/break | | | | | No |
| Neutral conductor | No | No | No | No | |
| Measuring range | | | | | |
| Overvoltage | 3 x 220 - 300 v AC | 3 x 418 V AC | 3 x 440 V AC | 3 x 420 - 500 V AC | 3 x 220 - 300 V AC |
| Undervoltage | 3 x 160 - 230 V AC | 3 x 342 V AC | 3 x 360 V AC | 3 x 300 - 380 V AC | 3 x 160 - 230 V AC |
| Asymmetry | No | No | No | No | 2 - 25 % of phase voltage mean value |
| Adjustable threshold values | | | | | |
| Overvoltage | Adjustable within measuring range | Fixed | Fixed | Adjustable within measuring range | Adjustable within measuring range |
| Undervoltage | Adjustable within measuring range | Fixed | Fixed | Adjustable within measuring range | Adjustable within measuring range |
| Imbalance (disconnection value) | No | No | No | No | Adjustable within measuring range |
| Asymmetry | | | | | |
| Hysteresis relative to threshold value | | | | | |
| Overvoltage/undervoltage | Fixed 5 % | Fixed 5 % | Fixed 5 % | Fixed 5 % | Fixed 5 % |
| Asymmetry | No | No | No | No | Fixed 20 % |
| Rated frequency of measuring signal | 50/60 Hz | 50/60 Hz | 50/60 Hz | 50/60 Hz | 50/60 Hz |
| Frequency range of measuring signal | 45 - 65 Hz | 45 - 65 Hz | 45 - 65 Hz | 45 - 65 Hz | 45 - 65 Hz |
| Reaction time | No | No | No | No | |
| Maximum monitoring cycle | 100 ms | 100 ms | 100 ms | 100 ms | 100 ms |
| Measuring error within rated control voltage tolerance | $\leq 0.5 \%$ | $\leq 0.5 \%$ | $\leq 0.5 \%$ | $\leq 0.5 \%$ | $\leq 0.5 \%$ |
| Measuring error within temperature range | $\leq 0.06 \%/^{\circ}\text{C}$ | $\leq 0.06 \%/^{\circ}\text{C}$ | $\leq 0.06 \%/^{\circ}\text{C}$ | $\leq 0.06 \%/^{\circ}\text{C}$ | $\leq 0.06 \%/^{\circ}\text{C}$ |
| Measurement method | True RMS value measurement | | | | |
| Timing circuit | | | | | |
| On-delay T_S | Fixed 200 ms | Fixed 200 ms | Fixed 200 ms | Fixed 200 ms | Fixed 200 ms |
| On-delay T_{S1} | | | | | |
| Response delay T_V | On- or off-delay 0; 0, 1-30 s adjustable | On- or off-delay 0; 0, 1-30 s adjustable | On- or off-delay 0; 0, 1-30 s adjustable | On- or off-delay 0; 0, 1-30 s adjustable | On- or off-delay; none = 0, adjustable 0.1 - 30 s |
| Timeout error within rated control voltage tolerance | $\leq 0.5 \%$ | $\leq 0.5 \%$ | $\leq 0.5 \%$ | $\leq 0.5 \%$ | $\leq 0.5 \%$ |
| Timeout error within temperature range | $\leq 0.06 \%/^{\circ}\text{C}$ | $\leq 0.06 \%/^{\circ}\text{C}$ | $\leq 0.06 \%/^{\circ}\text{C}$ | $\leq 0.06 \%/^{\circ}\text{C}$ | $\leq 0.06 \%/^{\circ}\text{C}$ |
| Repetition accuracy (constant parameters) | $\pm 0.2 \%$ | $\pm 0.2 \%$ | $\pm 0.2 \%$ | $\pm 0.2 \%$ | $\pm 0.2 \%$ |
| Operating status indication | | | | | |
| Relay status R: yellow LED | See instructional leaflet | See instructional leaflet | See instructional leaflet | See instructional leaflet | See instructional leaflet |

| EMR5-AW500-1-D | EMR5-AWM580-2 | EMR5-AWM720-2 | EMR5-AWM820-2 | EMR5-AWN170-1-E | EMR5-AWN280-1 | EMR5-AWN280-1-F | EMR5-AWN500-1 |
|---|---|---|---|---|---|---|---|
| L1, L2, L3 | L1, L2, L3 | L1, L2, L3 | L1, L2, L3 | L1, L2, L3, N | L1,L2,L3 N | L1, L2, L3, N | L1,L2,L3 |
| 3 x 300 - 500 V AC | 3 x 350 - 580 V AC | 3 x 450 - 720 V AC | 3 x 530 - 820 V AC | 3 x 90 - 170 V AC | 3 x 180 - 280 V AC | 3 x 180 - 280 V AC | 3 x 300 - 500 V AC |
| -15 - +10 % | -15 - +10 % | -15 - +10 % | -15 - +10 % | -15 - +10 % | -15 - +10 % | -15 - +10 % | -15 - +10 % |
| 50/60 Hz | 50/60 Hz | 50/60 Hz | 50/60 Hz | 50/60 Hz | 50/60/400 Hz | 50/60 Hz | 50/60/400 Hz |
| 45 - 65 Hz | 45 - 65 Hz | 45 - 65 Hz | 45 - 65 Hz | 45 - 65 Hz | 45 - 440 Hz | 45 - 65 Hz | 45 - 440 Hz |
| 25 mA/18 VA (400 V AC) | 29 mA/41 VA (480 V AC) | 29 mA/52 VA (600 V AC) | 29 mA/59 VA (690 V AC) | 25 mA / 10 VA (115 V AC) | 5 mA/4 VA (230 V AC) | 25 mA/18 VA (230 V AC) | 5 mA/4 VA (400 V AC) |
| | 100% | 100% | 100% | | 100% | | 100% |
| Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Can be deactivated | Can be deactivated | Can be deactivated | Can be deactivated | Can be deactivated | Can be deactivated | Can be deactivated | Can be deactivated |
| No | Yes | Yes | Yes | No | Yes | No | Yes |
| Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| No | No | No | No | Yes | Yes | Yes | No |
| | | | | | | | |
| 3 x 420 - 500 V AC | 3 x 480 - 580 V AC | 3 x 690 - 820 V AC | 3 x 690 - 820 V AC | 3 x 120 - 170 V AC | 3 x 240 - 280 V AC | 3 x 240 - 280 V AC | 3 x 420 - 500 V AC |
| 3 x 300 - 380 V AC | 3 x 450 - 570 V AC | 3 x 530 - 660 V AC | 3 x 530 - 660 V AC | 3 x 90 - 130 V AC | 3 x 180 - 220 V AC | 3 x 180 - 220 V AC | 3 x 300 - 380 V AC |
| 2 - 25 % of phase voltage mean value | 2 - 25 % of phase voltage mean value | 2 - 25 % of phase voltage mean value | 2 - 25 % of phase voltage mean value | 2 - 25 % of phase voltage mean value | 2 - 25 % of phase voltage mean value | 2 - 25 % of phase voltage mean value | 2 - 25 % of phase voltage mean value |
| Adjustable within measuring range | Adjustable within measuring range | Adjustable within measuring range | Adjustable within measuring range | Adjustable within measuring range | Adjustable within measuring range | Adjustable within measuring range | Adjustable within measuring range |
| Adjustable within measuring range | Adjustable within measuring range | Adjustable within measuring range | Adjustable within measuring range | Adjustable within measuring range | Adjustable within measuring range | Adjustable within measuring range | Adjustable within measuring range |
| Adjustable within measuring range | 2 - 25 % of phase voltage mean value | 2 - 25 % of phase voltage mean value | 2 - 25 % of phase voltage mean value | Adjustable within measuring range | Adjustable within measuring range | Adjustable within measuring range | Adjustable within measuring range |
| | Adjustable within measuring range | Adjustable within measuring range | Adjustable within measuring range | Adjustable within measuring range | Adjustable within measuring range | Adjustable within measuring range | Adjustable within measuring range |
| Fixed 5 % | Fixed 5 % | Fixed 5 % | Fixed 5 % | Fixed 5 % | Fixed 5 % | Fixed 5 % | Fixed 5 % |
| Fixed 20 % | Fixed 20 % | Fixed 20 % | Fixed 20 % | Fixed 20 % | Fixed 20 % | Fixed 20 % | Fixed 20 % |
| 50/60 Hz | 50/60 Hz | 50/60 Hz | 50/60 Hz | 50/60 Hz | 50/60/400 Hz | 50/60 Hz | 50/60/400 Hz |
| 45 - 65 Hz | 45 - 65 Hz | 45 - 65 Hz | 45 - 65 Hz | 45 - 65 Hz | 45 - 440 Hz | 45 - 65 Hz | 45 - 440 Hz |
| 100 ms | 100 ms | 100 ms | 100 ms | 100 ms | 100 ms | 100 ms | 100 ms |
| ≤ 0.5 % | ≤ 0.5 % | ≤ 0.5 % | ≤ 0.5 % | ≤ 0.5 % | ≤ 0.5 % | ≤ 0.5 % | ≤ 0.5 % |
| ≤ 0.06 %/°C | ≤ 0.06 %/°C | ≤ 0.06 %/°C | ≤ 0.06 %/°C | ≤ 0.06 %/°C | ≤ 0.06 %/°C | ≤ 0.06 %/°C | ≤ 0.06 %/°C |
| True RMS value measurement | | | | | | | |
| Fixed 200 ms | Fixed 200 ms Fixed 250 ms | Fixed 200 ms Fixed 250 ms | Fixed 200 ms Fixed 250 ms | Fixed 200 ms | Fixed 200 ms Fixed 250 ms | Fixed 200 ms | Fixed 200 ms Fixed 250 ms |
| On- or off-delay; none = 0, adjustable 0.1 - 30 s | On- or off-delay; none = 0, adjustable 0.1 - 30 s | On- or off-delay; none = 0, adjustable 0.1 - 30 s | On- or off-delay; none = 0, adjustable 0.1 - 30 s | On- or off-delay; none = 0, adjustable 0.1 - 30 s | On- or off-delay; none = 0, adjustable 0.1 - 30 s | On- or off-delay; none = 0, adjustable 0.1 - 30 s | On- or off-delay; none = 0, adjustable 0.1 - 30 s |
| ≤ 0.5 % | ≤ 0.5 % | ≤ 0.5 % | ≤ 0.5 % | ≤ 0.5 % | ≤ 0.5 % | ≤ 0.5 % | ≤ 0.5 % |
| ≤ 0.06 %/°C | ≤ 0.06 %/°C | ≤ 0.06 %/°C | ≤ 0.06 %/°C | ≤ 0.06 %/°C | ≤ 0.06 %/°C | ≤ 0.06 %/°C | ≤ 0.06 %/°C |
| ±0.2 % | ±0.2 % | ±0.2 % | ±0.2 % | ±0.2 % | ±0.2 % | ±0.2 % | ±0.2 % |
| See instructional leaflet | See instructional leaflet | See instructional leaflet | See instructional leaflet | See instructional leaflet | See instructional leaflet | See instructional leaflet | See instructional leaflet |

Electronic relays

Measuring and monitoring relays

EMR

| | EMR5-W300-1-C | EMR5-W380-1 | EMR5-W400-1 | EMR5-W500-1-D | EMR5-AW300-1-C |
|---|--|--|--|--|--|
| Output circuits | | | | | |
| Output circuits | 15-16/18, 25-26/28 | 15-16/18, 25-26/28 | 15-16/18, 25-26/28 | 15-16/18, 25-26/28 | 15-16/18, 25-26/28 |
| Output type | 2 x 1 relay (changeover contact) | 2 x 1 relay (changeover contact) | 2 x 1 relay (changeover contact) | 2 x 1 relay (changeover contact) | 1 x 2 relays (changeover contact) |
| Operating principle | Closed-circuit principle: Output relays drop out when value above/below set threshold value | | | | |
| Contact material | AgNi alloy, Cd-free | | | | |
| Rated operating voltage (VDE 0110, IEC 60947-1) | 250 V | 250 V | 250 V | 250 V | 250 V |
| Minimum switching voltage/minimum switching current | No | No | No | No | No |
| Minimum switching duty | 24 V/10 mA | 24 V/10 mA | 24 V/10 mA | 24 V/10 mA | 24 V/10 mA |
| Maximum switching voltage | See TB_EMR_PRO_01 | See TB_EMR_PRO_01 | See TB_EMR_PRO_01 | See TB_EMR_PRO_01 | See TB_EMR_PRO_01 |
| Rated operational current (IEC 60947-5-1) | | | | | |
| AC12 (resistive) at 230 V | 4 A | 4 A | 4 A | 4 A | 4 A |
| AC15 (inductive) at 230 V | 3 A | 3 A | 3 A | 3 A | 3 A |
| DC12 (resistive) at 24 V | 4 A | 4 A | 4 A | 4 A | 4 A |
| DC13 (inductive) at 24 V | 2 A | 2 A | 2 A | 2 A | 2 A |
| Rated operational data AC (UL 508) | | | | | |
| Utilization category (Control Circuit Rating Code) | B 300 | B 300 | B 300 | B 300 | B 300 |
| Max. rated operational voltage | 300 V AC | 300 V AC | 300 V AC | 300 V AC | 300 V AC |
| Max. thermal uninterrupted current at B 300 | 5 A | 5 A | 5 A | 5 A | 5 A |
| Max. input/output rating(N/O / N/C) for B 300 | 3600/360 VA | 3600/360 VA | 3600/360 VA | 3600/360 VA | 3600/360 VA |
| Mechanical lifespan | | | | | |
| | 30 x 10 ⁶ operations | 30 x 10 ⁶ operations | 30 x 10 ⁶ operations | 30 x 10 ⁶ operations | 30 x 10 ⁶ operations |
| Electrical lifespan (AC12, 230 V, 4 A) | | | | | |
| | 0.1 x 10 ⁶ operations | 0.1 x 10 ⁶ operations | 0.1 x 10 ⁶ operations | 0.1 x 10 ⁶ operations | 0.1 x 10 ⁶ operations |
| Short-circuit strength, maximum fuse rating | | | | | |
| Normally closed contact | 6 A fast | 6 A fast | 6 A fast | 6 A fast | 6 A fast |
| Normally open contact | 10 A fast | 10 A fast | 10 A fast | 10 A fast | 10 A fast |
| Duty factor (DF) | 100 % | 100 % | 100 % | 100 % | 100 % |
| General data | | | | | |
| Enclosure measurements (w x h x d) | | | | | |
| | 22.5 x 78 x 100 mm (0.89 x 3.07 x 3.94 inches) | 22.5 x 78 x 100 mm (0.89 x 3.07 x 3.94 inches) | 22.5 x 78 x 100 mm (0.89 x 3.07 x 3.94 inches) | 22.5 x 78 x 100 mm (0.89 x 3.07 x 3.94 inches) | 22.5 x 78 x 100 mm (0.89 x 3.07 x 3.94 inches) |
| Mounting position | Any | Any | Any | Any | Any |
| Weight | | | | | 0.13 kg (0.29 lb) |
| Degree of protection of enclosures/terminals | IP50/IP20 | IP50/IP20 | IP50/IP20 | IP50/IP20 | IP50/IP20 |
| Mounting | DIN rail (IEC/EN 60715), clip-type toolless | | | | |
| Minimum distance to adjacent devices | | | | | |
| Horizontal (min. 10 mm from continuous voltage) | > 220 V | > 400 V | > 400 V | > 400 V | > 220 V |
| Vertical | None | None | None | None | None |
| Electrical connection | | | | | |
| Terminal capacities | | | | | |
| Flexible with ferrule | 2 x 0.75-2.5 mm ² (2 x 18 - 14 AWG) | | | | |
| Flexible without ferrule | 2 x 0.75-2.5 mm ² (2 x 18 - 14 AWG) | | | | |
| Rigid | 2 x 0.5-4 mm ² (2 x 20 - 12 AWG) | | | | |
| Stripped length | 7 mm (0.28 inches) | 7 mm (0.28 inches) | 7 mm (0.28 inches) | 7 mm (0.28 inches) | 7 mm (0.28 inches) |
| Tightening torque | 0.6 - 0.8 Nm | 0.6 - 0.8 Nm | 0.6 - 0.8 Nm | 0.6 - 0.8 Nm | 0.6 - 0.8 Nm |
| Environmental data | | | | | |
| Ambient temperature range, operation/storage | | | | | |
| | -25 - +60 °C / -40 - +85 °C | | | | |
| Damp heat (IEC 60068-2-30) | | | | | |
| | 55 °C, 6 cycles | | | | |
| Climate class | | | | | |
| | 3K3 | | | | |
| Vibration (sinusoidal) (IEC/EN) 60255-21-1) | | | | | |
| | Class 2 | | | | |
| Impact (IEC/EN 60255-21-2) | | | | | |
| | Class 2 | | | | |

Electronic relays

Measuring and monitoring relays

| EMR5-AW500-1-D | EMR5-AWM580-2 | EMR5-AWM720-2 | EMR5-AWM820-2 | EMR5-AWN170-1-E | EMR5-AWN280-1 | EMR5-AWN280-1-F | EMR5-AWN500-1 |
|--|---|---|---|--|---|--|---|
| 15-16/18, 25-26/28 | 15-16/18, 25-26/28 | 15-16/18, 25-26/28 | 15-16/18, 25-26/28 | 15-16/18, 25-26/28 | 15-16/18, 25-26/28 | 15-16/18, 25-26/28 | 15-16/18, 25-26/28 |
| 1 x 2 relays (changeover contact) | 2 x 1 or 1 x 2 changeover contact, selectable (relay) | 2 x 1 or 1 x 2 changeover contact, selectable (relay) | 2 x 1 or 1 x 2 changeover contact, selectable (relay) | 1 x 2 relays (changeover contact) | 2 x 1 or 1 x 2 changeover contact, selectable (relay) | 1 x 2 relays (changeover contact) | 2 x 1 or 1 x 2 changeover contact, selectable (relay) |
| 250 V | 250 V | 250 V | 250 V | 250 V | 250 V | 250 V | 250 V |
| 24 V/10 mA | 24 V/10 mA | 24 V/10 mA | 24 V/10 mA | 25 V/10 mA | 26 V/10 mA | 27 V/10 mA | 28 V/10 mA |
| See TB_EMR_PRO_01 | See TB_EMR_PRO_02 | See TB_EMR_PRO_02 | See TB_EMR_PRO_02 | See TB_EMR_PRO_01 | See TB_EMR_PRO_01 | See TB_EMR_PRO_01 | |
| 4 A | 4 A | 4 A | 4 A | 4 A | 4 A | 4 A | 4 A |
| 3 A | 3 A | 3 A | 3 A | 3 A | 3 A | 3 A | 3 A |
| 4 A | 4 A | 4 A | 4 A | 4 A | 4 A | 4 A | 4 A |
| 2 A | 2 A | 2 A | 2 A | 2 A | 2 A | 2 A | 2 A |
| B 300 | B 300 | B 300 | B 300 | B 300 | B 300 | B 300 | B 300 |
| 300 V AC | 300 V AC | 300 V AC | 300 V AC | 300 V AC | 300 V AC | 300 V AC | 300 V AC |
| 5 A | 5 A | 5 A | 5 A | 5 A | 5 A | 5 A | 5 A |
| 3600/360 VA | 3600/360 VA | 3600/360 VA | 3600/360 VA | 3600/360 VA | 3600/360 VA | 3600/360 VA | 3600/360 VA |
| 30 x 10 ⁶ operations | 30 x 10 ⁶ operations | 30 x 10 ⁶ operations | 30 x 10 ⁶ operations | 30 x 10 ⁶ operations | 30 x 10 ⁶ operations | 30 x 10 ⁶ operations | 30 x 10 ⁶ operations |
| 0.1 x 10 ⁶ operations | 0.1 x 10 ⁶ operations | 0.1 x 10 ⁶ operations | 31 x 10 ⁶ operations | 31 x 10 ⁶ operations | 0.1 x 10 ⁶ operations | 0.1 x 10 ⁶ operations | 0.1 x 10 ⁶ operations |
| 6 A fast | 10 A fast | 10 A fast | 10 A fast | 6 A fast | 6 A fast | 6 A fast | 6 A fast |
| 10 A fast | 10 A fast | 10 A fast | 10 A fast | 10 A fast | 10 A fast | 10 A fast | 10 A fast |
| 100 % | 100 % | 100 % | 100 % | 100 % | 100 % | 100 % | 100 % |
| 22.5 x 78 x 100 mm (0.89 x 3.07 x 3.94 inches) | 45 x 78 x 100 mm (1.78 x 3.07 x 3.94 inches) | 45 x 78 x 100 mm (1.78 x 3.07 x 3.94 inches) | 45 x 78 x 100 mm (1.78 x 3.07 x 3.94 inches) | 22.5 x 78 x 100 mm (0.89 x 3.07 x 3.94 inches) | 22.5 x 78 x 100 mm (0.89 x 3.07 x 3.94 inches) | 22.5 x 78 x 100 mm (0.89 x 3.07 x 3.94 inches) | 22.5 x 78 x 100 mm (0.89 x 3.07 x 3.94 inches) |
| Any | Any | Any | Any | Any | Any | Any | Any |
| 0.13 kg (0.29 lb) | 0.22 kg (0.49 lb) | 0.22 kg (0.49 lb) | 0.22 kg (0.49 lb) | 0.14 kg (0.31 lb) | 0.14 kg (0.31 lb) | 0.14 kg (0.31 lb) | 0.13 kg (0.29 lb) |
| IP50/IP20 | IP50/IP20 | IP50/IP20 | IP50/IP20 | IP50/IP21 | IP50/IP20 | IP50/IP20 | IP50/IP20 |
| > 400 V | None | None | None | > 120 V | None | > 240 V | None |
| None | None | None | None | None | None | None | None |
| 7 mm (0.28 inches) | 7 mm (0.28 inches) | 7 mm (0.28 inches) | 7 mm (0.28 inches) | 7 mm (0.28 inches) | 7 mm (0.28 inches) | 7 mm (0.28 inches) | 7 mm (0.28 inches) |
| 0.6 - 0.8 Nm | 0.6 - 0.8 Nm | 0.6 - 0.8 Nm | 0.6 - 0.8 Nm | 0.6 - 0.8 Nm | 0.6 - 0.8 Nm | 0.6 - 0.8 Nm | 0.6 - 0.8 Nm |
| 55 °C, 6 cycles | 55 °C, 6 cycles | 55 °C, 6 cycles | 55 °C, 6 cycles | 55 °C, 6 cycles | 55 °C, 6 cycles | 55 °C, 6 cycles | 55 °C, 6 cycles |
| 3K3 | 3K3 | 3K3 | 3K3 | 3K3 | 3K3 | 3K3 | 3K3 |
| Class 2 | Class 2 | Class 2 | Class 2 | Class 2 | Class 2 | Class 2 | Class 2 |
| Class 2 | Class 2 | Class 2 | Class 2 | Class 2 | Class 2 | Class 2 | Class 2 |

Electronic relays

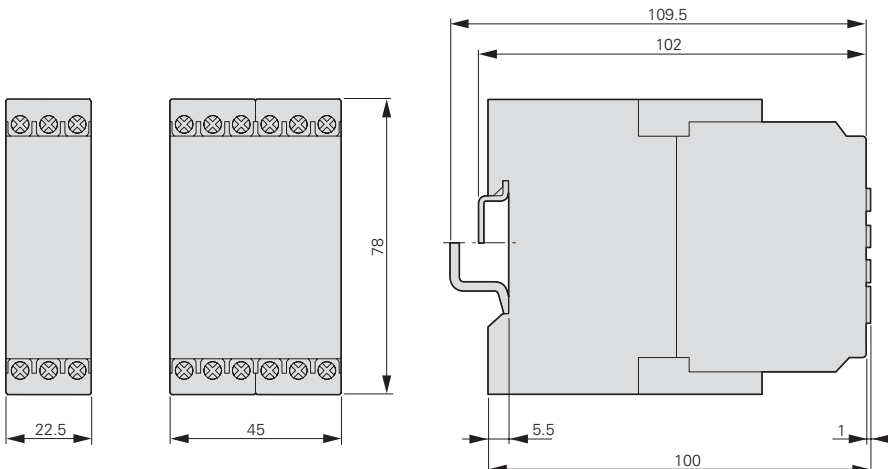
EMR

| | EMR5-W300-1-C | EMR5-W380-1 | EMR5-W400-1 | EMR5-W500-1-D | EMR5-AW300-1-C |
|---|----------------------|----------------------|----------------------|----------------------|----------------------|
| Insulation data | | | | | |
| Rated insulation voltage U_i | | | | | |
| Input circuit/output circuit | 600 V | 600 V | 600 V | 600 V | 600 V |
| Input circuit 1/output circuit 2 | 300 V | 300 V | 300 V | 300 V | 300 V |
| Rated impulse withstand voltage U_{imp} (VDE 0110, IEC/EN 60664) | | | | | |
| Input circuit | 6 kV; 1.2/50 μ s | 6 kV; 1.2/50 μ s | 6 kV; 1.2/50 μ s | 6 kV; 1.2/50 μ s | 6 kV; 1.2/50 μ s |
| Output circuits | 4 kV; 1.2/50 μ s | 4 kV; 1.2/50 μ s | 4 kV; 1.2/50 μ s | 4 kV; 1.2/50 μ s | 4 kV; 1.2/50 μ s |
| Test voltage between all insulated circuits (routine test) | | | | | |
| Input circuit and insulated output circuits | 2.5 kV, 50 Hz, 1 s | 2.5 kV, 50 Hz, 1 s | 2.5 kV, 50 Hz, 1 s | 2.5 kV, 50 Hz, 1 s | 2.5 kV, 50 Hz, 1 s |
| Basic insulation, input circuit/output circuit | | | | | |
| Safe isolation (VDE 0160 Part 101 and 101/A1, IEC/EN 61140) input circuit/output circuit | No | No | No | No | No |
| Pollution degree (VDE 0110, IEC/EN 60664, UL 508) | | | | | |
| Overvoltage category (VDE 0110, IEC 60664, UL 508) | III | III | III | III | III |
| Directives and standards | | | | | |
| Product standard IEC/EN 60255-6, EN 50178 | | | | | |
| Low-Voltage Directive | 2006/95/EC | 2006/95/EC | 2006/95/EC | 2006/95/EC | 2006/95/EC |
| EMC Directive | 2004/108/EC | 2004/108/EC | 2004/108/EC | 2004/108/EC | 2004/108/EC |
| RoHS Directive | 2002/95/EC | 2002/95/EC | 2002/95/EC | 2002/95/EC | 2002/95/EC |
| Electromagnetic compatibility | | | | | |
| Interference immunity EN 61000-6-1, EN 61000-6-2 | | | | | |
| Electrostatic discharge (ESD) IEC/EN 61000-4-2 | Level 3 (6 kV/8 kV) | Level 3 (6 kV/8 kV) | Level 3 (6 kV/8 kV) | Level 3 (6 kV/8 kV) | Level 3 (6 kV/8 kV) |
| Electromagnetic field (immunity to RF interference) IEC/EN 61000-4-3 | | | | | |
| Fast transients (burst) IEC/EN 61000-4-4 | Level 3 (2 kV/2 kHz) | Level 3 (2 kV/2 kHz) | Level 3 (2 kV/2 kHz) | Level 3 (2 kV/2 kHz) | Level 3 (2 kV/2 kHz) |
| High-energy pulses (surge) IEC 1000-4-5, EN 61000-4-5 | | | | | |
| Cable-borne HF IEC 100-4-6, EN 61000-4-6 | Level 3 (10 V) | Level 3 (10 V) | Level 3 (10 V) | Level 3 (10 V) | Level 3 (10 V) |
| Resistance to harmonics EN 61000-4-13 | | | | | |
| Emitted interference | Class 3 | Class 3 | Class 3 | Class 3 | Class 3 |
| Electromagnetic field (immunity to RF interference) IEC/CISPR 22, EN 50022 | | | | | |
| Cable-borne HF | Class B | Class B | Class B | Class B | Class B |

Dimensions

Measuring and monitoring relays

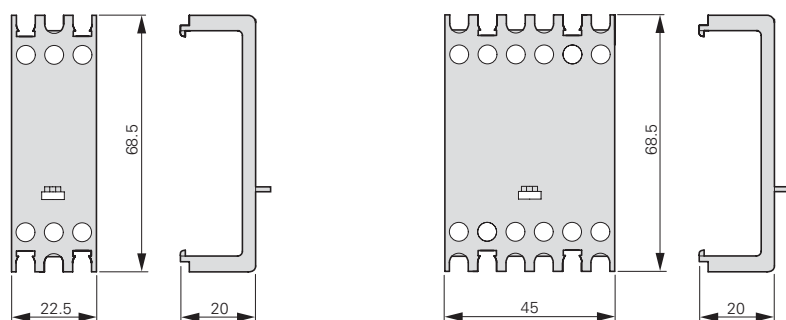
EMR-...



| EMR5-AW500-1-D | EMR5-AWM580-2 | EMR5-AWM720-2 | EMR5-AWM820-2 | EMR5-AWN170-1-E | EMR5-AWN280-1 | EMR5-AWN280-1-F | EMR5-AWN500-1 |
|----------------------|----------------------|----------------------|----------------------|------------------------|----------------------|----------------------|----------------------|
| 600 V | 1000 V | 1000 V | 1000 V | 600 V | 600 V | 600 V | 600 V |
| 300 V | 300 V | 300 V | 300 V | 300 V | 300 V | 300 V | 300 V |
| 6 kV; 1.2/50 μ s | 8 kV; 1.2/50 μ s | 8 kV; 1.2/50 μ s | 8 kV; 1.2/50 μ s | 6 kV; 1.2/50 μ s | 6 kV; 1.2/50 μ s | 6 kV; 1.2/50 μ s | 6 kV; 1.2/50 μ s |
| 4 kV; 1.2/50 μ s | 4 kV; 1.2/50 μ s | 4 kV; 1.2/50 μ s | 4 kV; 1.2/50 μ s | 4 kV; 1.2/50 μ s | 4 kV; 1.2/50 μ s | 4 kV; 1.2/50 μ s | 4 kV; 1.2/50 μ s |
| 2.5 kV, 50 Hz, 1 s | 2.5 kV, 50 Hz, 1 s | 2.5 kV, 50 Hz, 1 s | 2.5 kV, 50 Hz, 1 s | 2.5 kV, 50 Hz, 1 s | 2.5 kV, 50 Hz, 1 s | 2.5 kV, 50 Hz, 1 s | 2.5 kV, 50 Hz, 1 s |
| | 4 kV, 50 Hz, 1 s | 4 kV, 50 Hz, 1 s | 4 kV, 50 Hz, 1 s | | 2.5 kV, 50 Hz, 1 s | | 2.5 kV, 50 Hz, 1 s |
| 600 V | 1000 V | 1000 V | 1000 V | 600 V | 600 V | 600 V | 600 V |
| No | No | No | No | Yes | No | Yes | No |
| 3 | III | III | III | 3 | III | 3 | III |
| III | 3 | 3 | 3 | III | 3 | III | 3 |
| 2006/95/EC | 2006/95/EC | 2006/95/EC | 2006/95/EC | 2006/95/EC | 2006/95/EC | 2006/95/EC | 2006/95/EC |
| 2004/108/EC | 2004/108/EC | 2004/108/EC | 2004/108/EC | 2004/108/EC | 2004/108/EC | 2004/108/EC | 2004/108/EC |
| 2002/95/EC | 2002/95/EC | 2002/95/EC | 2002/95/EC | 2002/95/EC | 2002/95/EC | 2002/95/EC | 2002/95/EC |
| Level 3 (6 kV/8 kV) | Level 3 (6 kV/8 kV) | Level 3 (6 kV/8 kV) | Level 3 (6 kV/8 kV) | Level 3 (6 kV / 8 kV) | Level 3 (6 kV/8 kV) | Level 3 (6 kV/8 kV) | Level 3 (6 kV/8 kV) |
| Level 3 (10 V/m) | Level 3 (10 V/m) | Level 3 (10 V/m) | Level 3 (10 V/m) | Level 3 (10 V/m) | Level 3 (10 V/m) | Level 3 (10 V/m) | Level 3 (10 V/m) |
| Level 3 (2 kV/2 kHz) | Level 3 (2 kV/2 kHz) | Level 3 (2 kV/2 kHz) | Level 3 (2 kV/2 kHz) | Level 3 (2 kV / 2 kHz) | Level 3 (2 kV/2 kHz) | Level 3 (2 kV/2 kHz) | Level 3 (2 kV/2 kHz) |
| Level 4 (2 kV L-N) | Level 4 (2 kV L-L) | Level 4 (2 kV L-L) | Level 4 (2 kV L-L) | Level 4 (2 kV L-N) | Level 4 (2 kV L-N) | Level 4 (2 kV L-N) | Level 4 (2 kV L-L) |
| Level 3 (10 V) | Level 3 (10 V) | Level 3 (10 V) | Level 3 (10 V) | Level 3 (10 V) | Level 3 (10 V) | Level 3 (10 V) | Level 3 (10 V) |
| Class 3 | Class 3 | Class 3 | Class 3 | Class 3 | Class 3 | Class 3 | Class 3 |
| Class B | Class B | Class B | Class B | Class B | Class B | Class B | Class B |
| Class B | Class B | Class B | Class B | Class B | Class B | Class B | Class B |

Sealable shrouds

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Eaton Industries Pte Ltd
Electrical Sector
4 Loyang Lane #04-01/02
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