

Contactors

Utilization Categories

For easier choice of devices and in order to make the comparison of different products simpler are utilization categories for contactors and motor-starters according to IEC 947-4-1 and VDE 0660 Part 102, for

control circuit devices and switching elements according to IEC 947-5-1 and VDE 0660 Part 200 determined. The table offers different utilization categories, typical applications and assorted test conditions.

| Type of current | Category | Typical applications | Rated operational current | Test conditions for the number of on-load operating cycles | | | | | | Test conditions for making and breaking capacities | | | | | |
|---------------------|--|---|------------------------------|--|---|--|--|---------|------------|--|---------|------------|---------------|---------|------------|
| | | | | Make | | | Break | | | Make | | | Break | | |
| | | | | I/I_e | U/U_e | $\cos\phi$ | I/I_e | U/U_e | $\cos\phi$ | I/I_e | U/U_e | $\cos\phi$ | I/I_e | U/U_e | $\cos\phi$ |
| Alternating Current | AC1 | Non-inductive or slightly inductive loads resistance furnaces | all values | 1 | 1 | 0,95 | 1 | 1 | 0,95 | 1,5 | 1,05 | 0,8 | 1,5 | 1,05 | 0,8 |
| | AC2 | Slip-ring motors: starting, switching off | all values | 2,5 | 1 | 0,65 | 2,5 | 1 | 0,65 | 4 | 1,05 | 0,65 | 4 | 1,05 | 0,65 |
| | AC3 | Squirrel-cage motors: starting, switching off motors during running | $I_e < 17A$ $I_e > 100A$ | 6 1 0,65 6 1 0,35 6 1 0,35 | 1 0,17 0,65 1 0,17 0,35 1 0,17 0,35 | 10 1,05 0,45 10 1,05 0,45 10 1,05 0,35 | 8 1,05 0,45 8 1,05 0,45 8 1,05 0,35 | | | | | | | | |
| | AC4 | Squirrel-cage motors: starting, plugging, inching | $I_e < 17A$ $I_e > 100A$ | 6 1 0,65 6 1 0,35 6 1 0,35 | 6 1 0,65 6 1 0,35 6 1 0,35 | 12 1,05 0,45 12 1,05 0,45 12 1,05 0,35 | 10 1,05 0,45 10 1,05 0,45 10 1,05 0,35 | | | | | | | | |
| | AC5a | Switching of electric discharge lamp controls | all values | - | - | - | - | - | - | 3 | 1,05 | 0,45 | 3 | 1,05 | 0,45 |
| | AC5b | Switching of incandescent lamps | all values | - | - | - | - | - | - | 1,5 | 1,05 | 1) | 4 | 1,05 | 1) |
| | AC6a | Switching of transformers | $I_e < 100A$ $I_e > 100A$ | - - - - - - | - - - - - - | 4,5 1,05 0,45 4,5 1,05 0,35 | 3,6 1,05 0,45 3,6 1,05 0,35 | | | | | | | | |
| | AC6b | Switching of capacitors | - | - | - | - | - | - | 2) | | | 2) | | | |
| | AC7a | Slightly inductive loads in household appliances and similar applications | all values | - | - | - | - | - | - | 1,5 | 1,05 | 0,8 | 1,5 | 1,05 | 0,8 |
| | AC7b | Motor loads for household applications | $I_e < 100A$ $I_e > 100A$ | - - - - - - | - - - - - - | 8 1,05 0,45 8 1,05 0,35 | 6 1,05 0,45 6 1,05 0,35 | | | | | | | | |
| | AC8a | Hermetic refrigerant compressor motor control with manual resetting of overload releases | $I_e < 100A$ $I_e > 100A$ | - - - - - - | - - - - - - | 6 1,05 0,45 6 1,05 0,35 | 6 1,05 0,45 6 1,05 0,35 | | | | | | | | |
| | AC8b | Hermetic refrigerant compressor motor control with automatic resetting of overload releases | $I_e < 100A$ $I_e > 100A$ | - - - - - - | - - - - - - | 6 1,05 0,45 6 1,05 0,35 | 6 1,05 0,45 6 1,05 0,35 | | | | | | | | |
| | AC12 | Control of resistive loads and solid state loads with isolation by opto couplers | all values | - | - | - | - | - | - | 1 | 1 | 0,9 | 1 | 1 | 0,9 |
| | AC13 | Control of solid state loads with transformer isolation | all values | - | - | - | - | - | - | 10 | 1,1 | 0,65 | 1,1 | 1,1 | 0,65 |
| | AC14 | Control of small electromagnetic loads ($\leq 72VA$) | - | - | - | - | - | - | - | 6 | 1,1 | 0,7 | 6 | 1,1 | 0,7 |
| AC15 | Control of electromagnetic load ($> 72VA$) | - | 10 | 1 | 0,7 | 1 | 1 | 0,4 | 10 | 1,1 | 0,3 | 10 | 1,1 | 0,3 | |
| Direct Current | | | | Make I/I_e | U/U_e | L/R [ms] | Break I/I_e | U/U_e | L/R [ms] | Make I/I_e | U/U_e | L/R [ms] | Break I/I_e | U/U_e | L/R [ms] |
| | DC1 | Non-inductive or slightly inductive loads resistance furnaces | all values | 1 | 1 | 1 | 1 | 1 | 1 | 1,5 | 1,05 | 1 | 1,5 | 1,05 | 1 |
| | DC3 | Shunt-motors: starting, plugging, inching dynamic braking of d.c. motors | all values | 2,5 | 1 | 2 | 2,5 | 1 | 2 | 4 | 1,05 | 2,5 | 4 | 1,05 | 2,5 |
| | DC5 | Series-motors: starting, plugging, inching dynamic braking of d.c. motors | all values | 2,5 | 1 | 7,5 | 2,5 | 1 | 7,5 | 4 | 1,05 | 15 | 4 | 1,05 | 15 |
| | DC6 | Switching of incandescent lamps | all values | - | - | - | - | - | - | 1,5 | 1,05 | 1) | 4 | 1,05 | 1) |
| | DC12 | Control of resistive loads and solid state loads with isolation by opto couplers | all values | - | - | - | - | - | - | 1 | 1 | 1 | 1 | 1 | 1 |
| | DC13 | Control of electromagnets | all values | 1 | 1 | ≤ 300 | 1 | 1 | ≤ 300 | 1,1 | 1,1 | ≤ 300 | 1,1 | 1,1 | ≤ 300 |
| DC14 | Control of electromagnetic loads having economy resistors in circuit | all values | - | - | - | - | - | - | 10 | 1,1 | 15 | 10 | 1,1 | 15 | |

U_e Rated operational voltage, U Voltage before make, U_r Recovery voltage, I_e Rated operational current, I Current make, I_c Current broken

1) Test with incandescent lamps

2) Test conditions according to standard