

Series CA5 Contactors

A
Contactors
CA5

The complete contactor for heavy industrial applications from 500HP to 900HP



CA5 Series contactors provide large horsepower performance with a design that is up to 40% smaller than traditional contactors of this rating. The entire line is modularly designed for easy inspection, contact replacement and coil change out. All maintenance can be performed from the front so that mounting can be accomplished with no wasted space on the sides.

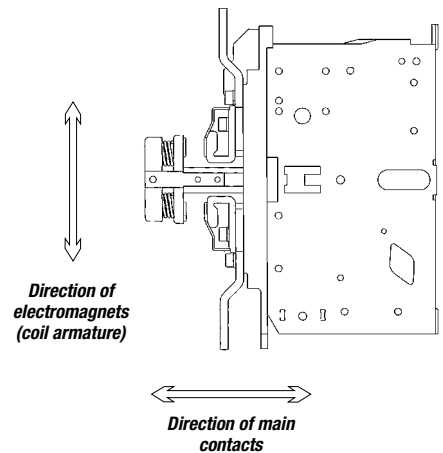
The contactor for large horsepower applications

The CA5 series consists of four contactors in two frame sizes covering motors from 500 to 900 HP (at 460V/575V). This line is well suited for heavy industrial applications utilizing large machinery and equipment such as rock quarries and mines, or for any large horsepower application where a rugged and dependable contactor is needed.

Specially designed shock-free contact system

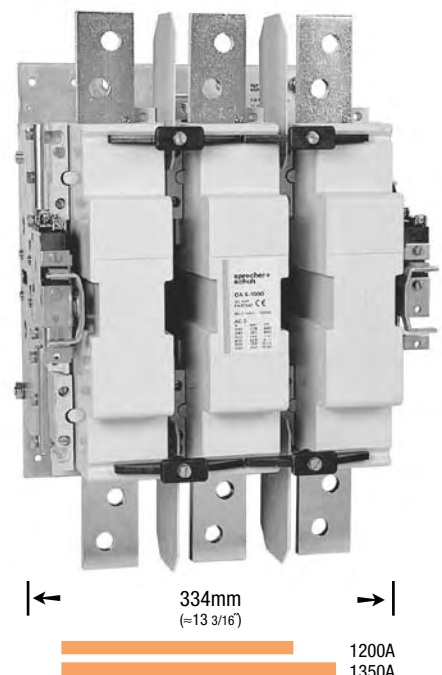
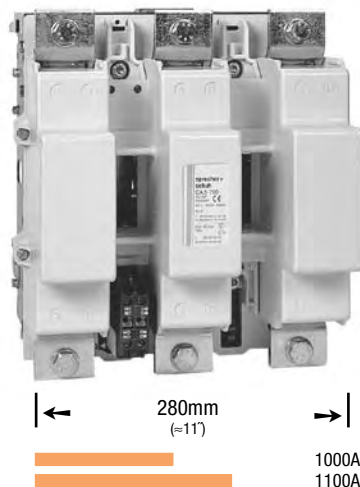
A characteristic of contactors in this size class is to transmit intense impact forces during operation. This is caused by the heavy magnetic armatures of the core, which can cause contact "bounce." CA5 contactors, however, are designed so that the operating planes of the electromagnets and the contacts are opposed to each other by

90°. This results in a bounce-free contact system, increasing the contactor's mechanical life and raising contact reliability.



Rugged and reliable

A massive steel framework supporting the magnet system ensures high stability in all applications. Low-wear materials for bearings and sliding surfaces, as well as generously dimensioned magnet-pole faces result in above average mechanical life with a minimum of maintenance. Despite their rugged construction, overall contactor weight has been reduced considerably permitting simpler panel construction and easier assembly.



Unique coil “feeder group” offers many advantages

CA5-700 and 860 contactors are equipped with a special “feeder group” for the coil that accommodates AC control voltages of 50 or 60Hz, and a wide range of DC voltages.



This coil arrangement eliminates noise and provides very low pickup and hold-in current. In addition, the drop-out time of the coil can be adjusted within one of three ranges.

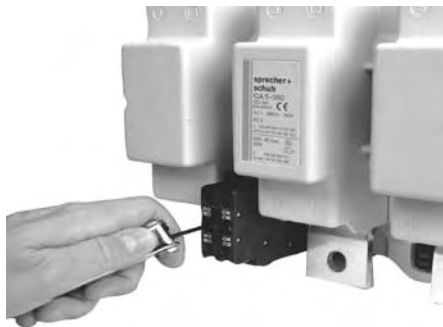
Normal Drop (150 to 200ms): for prompt reaction of contactor to a breaking command (factory setting).

Delayed Drop (0.5 to 1s): where it is necessary for the contactor to be immune to short power supply interruptions or uncertain control devices.

Fast Drop (about 20ms): for safety applications where instant drop-out is required.

Adjustable auxiliary contacts

CA5 contactors can be equipped with a maximum of four NO and four NC auxiliary contacts. In addition, the closing time of the auxiliary contacts (on CA5-700 & 860 contactors) can be adjusted to meet individual control requirements.

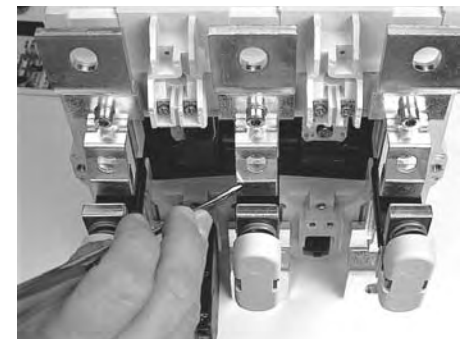
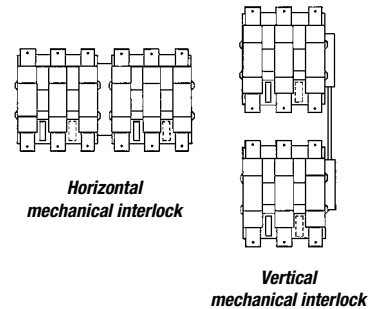


Add-on fourth pole

In many applications, the neutral also needs to be switched. All CA5 contactors can be fitted with a 4th pole on either the left or right side of the contactor. This switched neutral is available as an accessory that can easily be installed in the field.

Two choices for interlocking reversing contactors

Unique to the CA5 range is the ability to mechanically interlock reversing contactors in either a horizontal or vertical orientation. This feature allows maximum flexibility when laying out panels.

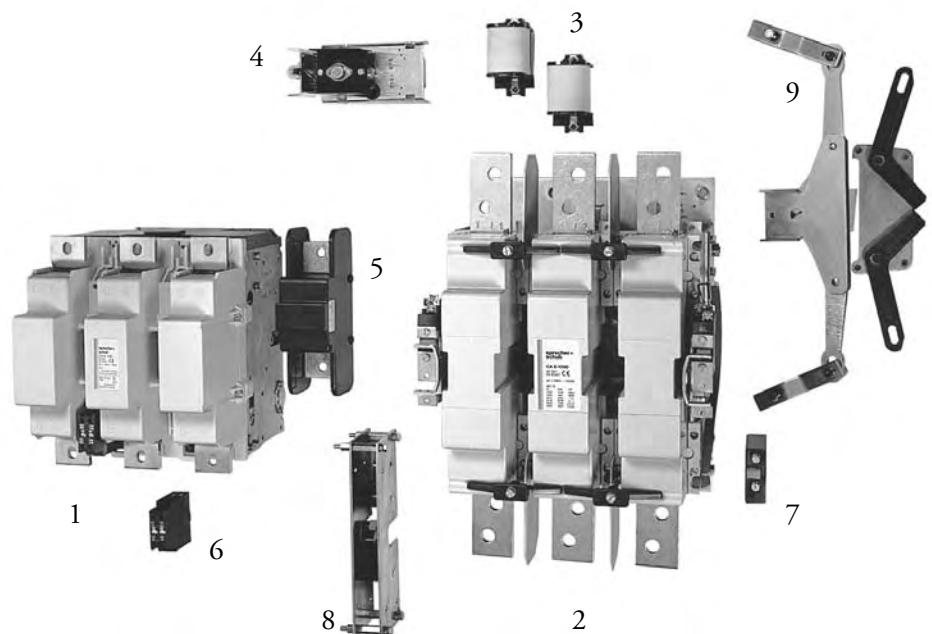


Simple main contact inspection and easy coil change

Modular, convenient design

The CA5 line is modularly designed for easy inspection, coil change and contact replacement. Maintenance can be performed from the front so that mounting requires no additional space. Even with the installation of mechanical interlocks and auxiliary contact blocks, the units can be flush mounted side by side, saving panel space.

- 1 CA5-700 Contactor
- 2 CA5-1000 Contactor
- 3 Coil Pair
- 4 Feeder Group
- 5 4th Pole (Neutral Switching)
- 6 Auxiliary Contact Block
- 7 Auxiliary Contact Block
- 8 Mechanical Interlock (horizontal)
- 9 Mechanical Interlock (vertical)



A full range of CA5 accessories is available, including a unique mechanical interlock that allows vertical mounting of contactors (see explanation above)

Non-Reversing, Three Pole Contactors With AC or DC Coil, Series CA5 (Open type only) ①③④

| I _e [A] | | Ratings for Switching AC Motors (AC2 / AC3 / AC4) | | | | | | | | | | Auxiliary Contacts per Contactor | | Open Type | |
|--------------------|------|---|------|------|--------------|------|---------------------|-----------------|-----------------|-----------------|----|----------------------------------|---------------|-----------|--------------|
| | | kW (50 Hz) | | | | | UL/CSA HP (60 Hz) ③ | | | | | | | | |
| | | AC-3 | AC-1 | 230V | 400V 415V | | 500V | 690V | 1000V | 3 Ø | | | | | |
| 200V | 230V | | | | 460V | 575V | | | | NO | NC | Catalog Number ①③ | Price | | |
| 700 | 1000 | 220 | 400 | 500 | 630 | 500 | 200 | 250 | 500 | 500 | 2 | | | 2 | CA5-700-22-* |
| 860 | 1100 | 280 | 500 | 630 | 710 | 550 | 250 | 300 | 600 | 600 | 2 | 2 | CA5-860-22-* | 12814 | |
| 1000 | 1200 | 315 | 510 | 750 | 850 | ~ | 350 ③ | 400 ③ | 800 ③ | 900 ③ | 1 | 2 | CA5-1000-12-* | 14900 | |
| 1150 | 1350 | 375 | 710 | 850 | 1000 | ~ | 450 | 450 | 900 | 900 | 1 | 2 | CA5-1200-12-* | 17960 | |

Note: CA5 open-type contactors include terminal bolts.
See pg. A108 for Lugs.

See Section C for reversing CA5 contactors.



CA5-700-22 contactor



CA5-1000-12 contactor

Coil Codes ①②


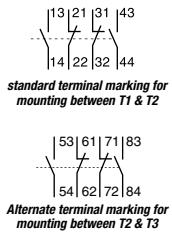

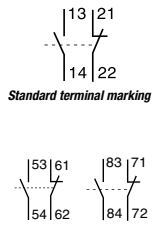
| CA5-700 / 860 | | | | CA5-1000 / 1200 | | |
|---------------|---------------|----------|------------|-----------------|---------------|-------|
| A.C. & D.C. | Voltage Range | | | AC | Voltage Range | |
| Coil Code | 50 Hz | 60 Hz | VDC | Coil Code | 50 Hz | 60 Hz |
| 120 | 110-120V | 110-120V | 100-110VDC | 110 | 110V | 110V |
| 240 | 220-240V | 220-240V | 200-220VDC | 220 | 220V | 220V |
| 380 | 380-415V | 380-415V | 345-380VDC | 380 | 380V | 380V |
| 480 | 440-480V | 440-480V | 400-440VDC | 440 | 440V | 440V |

Ordering Instructions


| | |
|------------------------------|---|
| ● Specify Catalog Number | See Coil Code table on this page for codes |
| ● Replace (*) with Coil Code | |

- ① CA5-700 and 860 contactors are equipped with coils that operate with both AC and DC control voltages. CA5-1000 and 1200 contactors operate with AC control voltage input that is rectified for DC coil operation. See page A109. Consult factory for DC control voltage input.
- ② Other voltages available, see page A109. **Non-standard coil voltages not listed here must be ordered and installed separately as renewal parts.**
- ③ CA5-1000 horsepower ratings per IEC Utilization category AC-3. See CA5 Technical Data section for additional sizing information. Label does not bear a UL/CSA horsepower rating.
- ④ The CA5-550 has been replaced by the CA6-420-EI contactor. CA5-700 has been replaced by CA6-630-EI. CA5-860 has been replaced by CA6-800-EI. These contactors are still available by special order if required for their higher AC1 ratings. See ratings in CA5 Technical Section.

Auxiliary Contact Blocks (2 & 4 Pole)

| Contact Block | Description | NO | NC | Contact Arrangement | For use with... | Catalog Number | Price |
|--|--|----|----|--|----------------------|----------------|-------|
|  4-pole | <ul style="list-style-type: none"> For mounting between T1 & T2 or between T2 & T3 Adjustable; provides normal, delayed or overlapping contacts ❶ Maximum two blocks per contactor ❷ Alternate terminal marking tags include | 2 | 2 |  <p>standard terminal marking for mounting between T1 & T2</p> <p>Alternate terminal marking for mounting between T2 & T3</p> | CA5-700 CA5-860 | CA5-EF22 ❷ | 441 |
|  2-pole | <ul style="list-style-type: none"> For side mounting on either side of the contactor Maximum four blocks per contactor ❸ Alternate terminal marking tags included | 1 | 1 |  <p>Standard terminal marking</p> | CA5-1000 CA5-1200 | CA5-EB11 ❸ | 698 |

Switched Neutral (4th Pole)


| 4th Pole | 4th Pole Amperes | For use with... | Catalog Number | Price |
|---|------------------|----------------------|----------------|-------|
|  | 500 | CA5-700 CA5-860 | CA5-NP500/6 | 1055 |
| | 900 | CA5-700 CA5-860 | CA5-NP1000/6 | 1390 |
| | | CA5-1000 CA5-1200 | CA5-NP1000/7 | 2094 |

❶ Further information on adjustable contacts can be found under “Auxiliary Contacts” in the CA5 Technical Section.



❷ Contactor comes standard with one 4-pole aux contact block.

❸ In addition to one standard two-pole auxiliary contact block (CA5-EB11), CA5-1000 & 1200 contactors are equipped from the factory with a special two pole auxiliary contact block (CA5-EB11DC). One of the poles is used for operation of the Feeder Group/Coil mechanism, the other NC contact is available for use. Two additional aux contact blocks may be added for a total of four.


Main Lugs

| Lug or Accessory | Description | Wire Size | Catalog Number | Price |
|---|---|--|---|----------------------------|
|  | Screw Type Lugs - (set of 6) For CA5-550 For CA5-700 For CA5-860 For CA5-1000 & CA5-1200 ❶ | (2) 2/0- 600MCM (2) 3/0- 750MCM (3) 2- 600MCM (4) 1/0- 750MCM | CA5-550-LU CA5-700-LU CA5-860-LU CA5-1200-LU | 335 419 1089 1256 |

Mechanical Interlock Kit

| For Horizontal Mounting of Contactors | | | |
|---|--|----------------|-------|
| Interlock | For use with... | Catalog Number | Price |
|  | CA5-700 CA5-860 CA5-700/CA5-860 | CA5-BM6H | 754 |
| | CA5-700/CA5-1000 CA5-700/CA5-1200 CA5-860/CA5-1000 CA5-860/CA5-1200 | CA5-BM67H | 2286 |
| | CA5-1000 CA5-1200 CA5-1000/CA5-1200 | CA5-BM7H | 1424 |
| For Vertical Mounting of Contactors | | | |
|  | CA5-700 CA5-860 CA5-700/CA5-860 | CA5-BM6V | 754 |
| | CA5-700/CA5-1000 CA5-700/CA5-1200 CA5-860/CA5-1000 CA5-860/CA5-1200 | CA5-BM67V | 2286 |
| | CA5-1000 CA5-1200 CA5-1000/CA5-1200 | CA5-BM7V | 1424 |

Mechanical Latch

| Latch | For use with... | Catalog Number | Price |
|---|--------------------|----------------|-------|
|  | CA5-700 CA5-860 | CA5-AM6-* | 1139 |
| | CA5-1200 | CA5-AM7-* | 1474 |

| CA5-AM- | |
|--------------|---------------|
| AC Coil Code | Voltage Range |
| 120 | 110V - 120V |
| 240 | 220V - 240V |
| 415 | 380V - 415V |
| 480 | 440V - 480V |

❶ CA5-1000 is not UL Listed.

All CA5 contactor coils are made up of two parts; the Coil Pair and Feeder Group. When ordering replacement parts, usually assume the Coil Pair must be replaced. If control voltage changes, user must order Coil Pair and matching Feeder Group.

Even though all CA5 coils are designed for AC *input* (DC input also available for CA5-550...860 contactors), they are operated by a DC voltage *supplied* from a "feeder group". Always order

by the Coil Code matched to the **actual control voltage available to the contactor**.

Further information on CA5 coil pairs and feeder groups can be found in CA5 Technical Information.

A.C. & D.C. Coil Pairs & Feeder Groups (CA5-550 to CA5-860) ①②③

| Voltage Range | COIL CODES | CA5-550 ① | | CA5-700 & CA5-860 | |
|--------------------------------|------------|---------------|---------------|-------------------|---------------|
| | | Coil Pair | Feeder Group | Coil Pair | Feeder Group |
| 110-120V 50/60Hz 100-110VDC | 120 | 22.807.301-10 | 22.807.204-10 | 22.809.301-10 | 22.809.204-10 |
| 220-240V 50/60Hz 200-220VDC | 240 | 22.807.301-13 | 22.807.204-13 | 22.809.301-13 | 22.809.204-13 |
| 380-415V 50/60Hz 345-380VDC | 380 | 22.807.301-16 | 22.807.204-16 | 22.809.301-16 | 22.809.204-16 |
| 440-480V 50/60Hz 400-440VDC | 480 | 22.807.301-18 | 22.807.204-18 | 22.809.301-18 | 22.809.204-18 |
| Price | | 1017 | 1102 | 1256 | 1312 |

A.C. Coil Pairs & Feeder Groups (CA5-1000 & CA5-1200) ②③

| Voltage Range | A.C. COIL CODES | CA5-1000 & CA5-1200 | |
|----------------------|-----------------|---------------------|---------------|
| | | Coil Pair | Feeder Group |
| 110 Volts 50/60Hz | 110 | 22.811.301-10 | 22.811.204-10 |
| 220 Volts 50/60Hz | 220 | 22.811.301-13 | 22.811.204-13 |
| 230 Volts 50/60Hz | 230 | 22.811.301-14 | 22.811.204-14 |
| 380 Volts 50/60Hz | 380 | 22.811.301-16 | 22.811.204-16 |
| 400 Volts 50/60Hz | 400 | 22.811.301-31 | 22.811.204-31 |
| 440 Volts 50/60Hz | 440 | 22.811.301-18 | 22.811.204-18 |
| Price | | 1982 | 3819 |

D.C. Coil Pairs & Feeder Groups (CA5-1000 & CA5-1200) ②③

| Voltage Range | D.C. COIL CODES | CA5-1000 & CA5-1200 | |
|----------------|-----------------|---------------------|------------------|
| | | Coil Pair | Feeder Group |
| 110 Volts D.C. | 110D | Refer to factory | Refer to factory |
| 220 Volts D.C. | 220D | Refer to factory | Refer to factory |
| Price | | Refer to factory | Refer to factory |



CA5 Coil Pair (typical)




CA5 Feeder Group - front view (typical)





CA5 Feeder Group - rear view (typical)

- ① The CA5-550 has been replaced by the CA6-420-EI contactor. CA5-550 contactors are still available by special order if required for their higher AC1 ratings.
- ② Other voltages available. Please contact factory.
- ③ CA5-550, 700 and 860 contactors are equipped with coils that operate with both AC and DC control voltages. For DC coil operation, select A.C. Coil Code for desired DC voltage. CA5-1000 and 1200 contactors operate with AC control voltage input that is rectified for DC coil operation. See page A115. Consult factory for DC control voltage input.


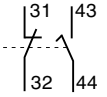
Main Contact - (1 Pole Per Set)

| Main Contacts (1pole) (typical) | For use with... | Catalog Number | Price per pole |
|---|-----------------|----------------|----------------|
|  | CA5-550 ① | 22.807.202-01 | 1089 |
| | CA5-700 | 22.808.202-01 | 1424 |
| | CA5-860 | 22.809.202-01 | 2094 |
| | CA5-1000 | 22.810.202-01 | 3224 |
| | CA5-1200 | 22.811.202-01 | 4188 |

Arc Chutes

| Arc Chutes (typical) | For use with... | Catalog Number | Price |
|--|-----------------|----------------|-------|
|  <p>3-pole (1 per contactor)</p> | CA5-550 ① | 22.807.201-01 | 975 |
| | CA5-700 | 22.808.201-01 | 1843 |
| | CA5-860 | 22.809.201-01 | 1843 |
|  <p>1-pole (3 per contactor)</p> | CA5-1000 | 22.810.201-01 | 838 |
| | CA5-1200 | 22.811.201-01 | 838 |

Replacement Auxiliary Contact Block (CA5-1000 & CA5-1200)

| Contact Block | Description | NO | NC | Contact Arrangement | For use with... | Catalog Number | Price |
|---|---|--------------------------|----|---|----------------------|----------------|-------|
|  | <ul style="list-style-type: none"> ● One supplied standard with contactor ● Special two pole design; 1 NO delayed make, 1 NC ● NO delayed make contact used for operation of the Feeder Group/Coil mechanism | 1 <i>Delayed Make</i> | 1 |  | CA5-1000 CA5-1200 | CA5-EB11DC | 771 |

① The CA5-550 has been replaced by the CA6-420-EI contactor. CA5-550 contactors are still available by special order if required for their higher AC1 ratings.

Technical Information

| | | | CA5-550 ❶ | CA5-700 ❷ | CA5-860 ❷ | CA5-1000 | CA5-1200 | |
|---|------|------------|--|-----------|-----------|----------|----------|-------|
| Rated Insulation Voltage U_i | | | | | | | | |
| to IEC947-1 | [V] | | 1000V | 1000V | 1000V | 690V | 690V | |
| UL/CSA | [V] | | | | 600V | | | |
| Rated Impulse Voltage U_{imp} | | | | | | | | |
| CA5-550 / 700 / 860 | [kV] | | | | 3.5 | | | |
| CA5-1000 / 1200 | [kV] | | | | 2.5 | | | |
| Rated Voltage U_e-Main Contacts | | | | | | | | |
| AC 50/60Hz | [V] | | 220/230, 240, 380/400,415,500,660/690 (1000V - CA5-550 to 860) | | | | | |
| DC | [V] | | 24, 48, 110, 220, 440V | | | | | |
| Operating Frequency for AC Loads | [Hz] | 50/60Hz | 180/hr. for 0.25s start time - 42/hr. for 1s start time | | | | | |
| Switching Motor Loads | | | | | | | | |
| Standard IEC Ratings | | | | | | | | |
| AC-2, AC-3 | | 230/240V | [A] | 550 | 700 | 860 | 1000 | 1200 |
| DOL & Reversing | | 400/415V | [A] | 550 | 700 | 860 | 1000 | 1200 |
| 50Hz/60° C | | 500V | [A] | 550 | 700 | 860 | 1000 | 1200 |
| | | 690V | [A] | 500 | 630 | 700 | 860 | 1000 |
| | | 230V | [kW] | 179 | 228 | 280 | 326 | 391 |
| | | 240V | [kW] | 187 | 238 | 293 | 340 | 408 |
| | | 400V | [kW] | 312 | 414 | 509 | 592 | 710 |
| | | 415V | [kW] | 324 | 430 | 528 | 628 | 737 |
| | | 500V | [kW] | 407 | 518 | 636 | 758 | 888 |
| | | 690V | [kW] | 510 | 657 | 730 | 897 | 1043 |
| UL/CSA | | 200V | [A] | 414 | 552 | 692 | ~ | 1185 |
| DOL & Reversing | | 230V | [A] | 360 | 602 | 722 | ~ | 1030 |
| 60Hz | | 460 V | [A] | 414 | 590 | 708 | ~ | 1062 |
| | 3Ø | 575 V | [A] | 336 | 472 | 576 | ~ | 864 |
| | | 200 V | [HP] | 150 | 200 | 250 | ~ | 450 |
| | | 230 V | [HP] | 150 | 250 | 300 | ~ | 450 |
| | | 460 V | [HP] | 350 | 500 | 600 | ~ | 900 |
| | | 575 V | [HP] | 350 | 500 | 600 | ~ | 900 |
| AC4 -200,000 Op. Cycles | | 230/240V | [A] | 140 | 180 | 210 | 260 | 300 |
| 50Hz | | 400/415V | [A] | 140 | 180 | 210 | 260 | 300 |
| | | 500V | [A] | 125 | 155 | 190 | 240 | 275 |
| | | 690V | [A] | 110 | 145 | 165 | 180 | 210 |
| | | 1000V | [A] | 95 | 120 | 145 | ~ | ~ |
| | | 230V | [kW] | 45 | 57 | 67 | 83 | 97 |
| | | 240V | [kW] | 47 | 60 | 70 | 87 | 101 |
| | | 400V | [kW] | 78 | 101 | 118 | 146 | 170 |
| | | 415V | [kW] | 81 | 105 | 122 | 151 | 176 |
| | | 500V | [kW] | 86 | 106 | 132 | 170 | 195 |
| | | 690V | [kW] | 100 | 135 | 155 | 165 | 190 |
| | | 1000V | [kW] | 130 | 170 | 205 | ~ | ~ |
| AC4 -200,000 Op. Cycles (25,000) | | 230/240V | [A] | 360 | 430 | 520 | (630) | (700) |
| Squirrel-cage motors with reversing and jogging | | 400/415V ❸ | [A] | 350 | 420 | 520 | (630) | (700) |
| | | 230V | [kW] | 116 | 139 | 170 | (205) | (228) |
| | | 240V | [kW] | 120 | 151 | 177 | (214) | (245) |
| | | 400V | [kW] | 198 | 238 | 295 | (357) | (414) |
| | | 415V | [kW] | 206 | 247 | 300 | (359) | (424) |

❶ The CA5-550 has been replaced by the CA6-420-EI contactor. CA5-550 contactors are available by special order if required for their higher AC1 ratings.
 ❷ The CA5-700 & 860 has been replaced by the CA6-630 & 860 contactor. CA5-700 & 860 contactors are available by special order.
 ❸ At rated voltage (415V) and rated current: Life span -25%.

Electrical Data

| | | | CA5-550 ❶ | CA5-700 ❷ | CA5-860 ❷ | CA5-1000 | CA5-1200 | |
|--|------------------------------------|----------|-----------|-----------|-----------|----------|----------|------|
| Switching Motor Loads (continued) | | | | | | | | |
| Wye-Delta (Star Delta) | | | | | | | | |
| 50 Hz | 230V | [A] | 953 | 1212 | 1490 | 1732 | 2078 | |
| | 240V | [A] | 953 | 1212 | 1490 | 1732 | 2078 | |
| | 400V | [A] | 953 | 1212 | 1490 | 1732 | 2078 | |
| | 415V | [A] | 953 | 1212 | 1490 | 1732 | 2078 | |
| | 500V | [A] | 953 | 1212 | 1490 | 1732 | 2078 | |
| | 690V | [A] | 831 | 1091 | 1195 | 1490 | 1732 | |
| | 230V | [kW] | 310 | 395 | 485 | 565 | 677 | |
| | 240V | [kW] | 324 | 412 | 507 | 589 | 707 | |
| | 400V | [kW] | 540 | 717 | 882 | 1025 | 1250 | |
| | 415V | [kW] | 561 | 745 | 915 | 1088 | 1278 | |
| | 500V | [kW] | 705 | 897 | 1102 | 1309 | 1538 | |
| | 690V | [kW] | 883 | 1138 | 1247 | 1554 | 2078 | |
| 60 Hz | 230V | [HP] | 250 | 450 | 500 | 650 | 750 | |
| | 460V | [HP] | 600 | 800 | 1000 | 1300 | 1500 | |
| | 575V | [HP] | 600 | 800 | 1000 | 1500 | 1500 | |
| | AC-1 Load, 3Ø Switching | | | | | | | |
| | Ambient Temperature 40° C | | | | | | | |
| | | I_{th} | [A] | 760 | 1000 | 1100 | 1200 | 1350 |
| Ambient Temperature 60° C | 230V | [kW] | 303 | 398 | 438 | 478 | 538 | |
| | 240V | [kW] | 316 | 416 | 457 | 499 | 561 | |
| | 400V | [kW] | 527 | 693 | 762 | 831 | 935 | |
| | 415V | [kW] | 546 | 719 | 791 | 863 | 970 | |
| | 500V | [kW] | 658 | 866 | 953 | 1039 | 1169 | |
| | 690V | [kW] | 908 | 1195 | 1315 | 1434 | 1613 | |
| | 1000V | [kW] | 1316 | 1732 | 1905 | ~ | ~ | |
| | | I_{th} | [A] | 605 | 800 | 870 | 960 | 1085 |
| Ambient Temperature 60° C | 230V | [kW] | 241 | 319 | 347 | 382 | 432 | |
| | 240V | [kW] | 251 | 333 | 362 | 399 | 451 | |
| | 400V | [kW] | 419 | 554 | 603 | 665 | 752 | |
| | 415V | [kW] | 435 | 575 | 625 | 690 | 780 | |
| | 500V | [kW] | 524 | 693 | 753 | 831 | 940 | |
| | 690V | [kW] | 723 | 956 | 1040 | 1147 | 1297 | |
| | 1000V | [kW] | 1048 | 1386 | 1507 | ~ | ~ | |
| | Continuous Current (UL/CSA) | | | | | | | |
| General Purpose Rating (40° C) | | | | | | | | |
| | | [A] | 520 | 700 | 810 | ~ | 1215 | |
| Rated Making Capacity | | | | | | | | |
| AC-3 I_e | 415V | [A] | 5500 | 7000 | 8600 | 10000 | 12000 | |
| | 500V | [A] | 5500 | 7000 | 8600 | 10000 | 12000 | |
| | 690V | [A] | 5500 | 7000 | 8600 | 10000 | 12000 | |
| Rated Breaking Capacity | | | | | | | | |
| AC-3 I_e | 240V | [A] | 4400 | 5600 | 6300 | 8000 | 9600 | |
| | 400V | [A] | 4400 | 5600 | 6900 | 8000 | 9600 | |
| | 415V | [A] | 4400 | 5600 | 6900 | 8000 | 9600 | |
| | 500V | [A] | 4400 | 5600 | 6900 | 8000 | 9600 | |
| | 690V | [A] | 4000 | 5100 | 5600 | 6900 | 8000 | |
| Short Circuit Protection of Contactors Without Overload Relay | | | | | | | | |
| Fuse gG (aM) Type 1 Coordination | | | | | | | | |
| (per IEC 60947-4-1) | 500V | [A] | (630) | 800 | 1000 | 1000 | 1250 | |
| | 690V | [A] | (630) | 800 | 1000 | 1000 | 1000 | |

❶ The CA5-550 has been replaced by the CA6-420-EI contactor. CA5-550 contactors are still available by special order if required for their higher AC1 ratings.

❷ The CA5-700 & 860 has been replaced by the CA6-630 & 860 contactor. CA5-700 & 860 contactors are available by special order.

Electrical Data

| | | | | CA5-550 ① | CA5-700 ② | CA5-860 ② | CA5-1000 | CA5-1200 |
|---|-------------------|---------|-------|-----------|-----------|-----------|----------|----------|
| DC Ratings | | | | | | | | |
| DC-1 Rating at 60° C | | | | | | | | |
| Non-inductive or slightly inductive loads, resistive furnaces | 1 pole | 24VDC | [A] | 605 | 800 | 870 | 960 | 1085 |
| | | 48VDC | [A] | 605 | 800 | 870 | 960 | 1085 |
| | 2 Poles in Series | 24VDC | [A] | 605 | 800 | 870 | 960 | 1085 |
| | | 48VDC | [A] | 605 | 800 | 870 | 960 | 1085 |
| | | 110VDC | [A] | 480 | 560 | 630 | 800 | 900 |
| | | 220VDC | [A] | 315 | 400 | 450 | 500 | 600 |
| | 3 Poles in Series | 24VDC | [A] | 605 | 800 | 870 | 960 | 1085 |
| | | 48VDC | [A] | 605 | 800 | 870 | 960 | 1085 |
| | | 110VDC | [A] | 480 | 560 | 630 | 800 | 900 |
| | | 220VDC | [A] | 315 | 400 | 450 | 500 | 600 |
| DC-3 Rating at 60° C | | | | | | | | |
| Shunt wound motors - Starting, reverse current breaking, reversing, stepping | 3 Poles in Series | 24VDC | [A] | 605 | 800 | 870 | 960 | 1085 |
| | | 48VDC | [A] | 605 | 800 | 870 | 960 | 1085 |
| DC-5 Rating at 60° C | | | | | | | | |
| Series wound motors - Starting, reverse current breaking, reversing, stepping | 3 Poles in Series | 24VDC | [A] | 605 | 800 | 870 | 900 | 1085 |
| | | 48VDC | [A] | 605 | 800 | 870 | 900 | 1085 |
| Lighting Loads | | | | | | | | |
| Elec. Dischrg. Lamps-AC-5a, single compensated | Open | [A] | 450 | 570 | 700 | 850 | 1000 | |
| | Enclosed | [A] | 360 | 460 | 550 | 660 | 800 | |
| Incandescent Lamps - AC AC-5b, Electrical endurance ~100,000 operations | | [A] | 315 | 440 | 500 | 560 | 630 | |
| Switching power transformers AC-6a | | | | | | | | |
| Inrush = $n \times I_e$ | | | | | | | | |
| Rated transformer current | | | | | | | | |
| n=30 | Inrush | 400 VAC | [A] | 7410 | 3450 | 11700 | 13500 | 16200 |
| | | 400 VAC | [A] | 259 | 330 | 405 | 470 | 570 |
| | | 400 VAC | [kVA] | 179 | 228 | 280 | 325 | 395 |
| | | 500 VAC | [kVA] | 224 | 226 | 350 | 407 | 493 |
| | | 690 VAC | [kVA] | 281 | 355 | 395 | 485 | 563 |
| n=20 | | 400 VAC | [A] | 389 | 495 | 608 | 700 | 850 |
| n=15 | | 400 VAC | [A] | 660 | 660 | 810 | 945 | 1130 |
| Rated making Capacity | | | | | | | | |
| AC-3 I _e | ≤415V | [A] | 5,500 | 7,000 | 8,600 | 10,000 | 12,000 | |
| | 500V | [A] | 5,500 | 7,000 | 8,600 | 10,000 | 12,000 | |
| | 690V | [A] | 5,500 | 6,300 | 7,000 | 8,600 | 10,300 | |
| Rated making Capacity | | | | | | | | |
| AC-3 I _e | ≤240V | [A] | 5,500 | 7,000 | 8,000 | 8,000 | 9,600 | |
| | 400V | [A] | 4,500 | 5,600 | 6,900 | 8,000 | 9,600 | |
| | 415V | [A] | 4,500 | 5,600 | 6,900 | 8,000 | 9,600 | |
| | 500V | [A] | 4,500 | 5,600 | 6,900 | 8,000 | 9,600 | |
| | 690V | [A] | 4,500 | 5,700 | 5,600 | 6,900 | 8,000 | |

① The CA5-550 has been replaced by the CA6-420-EI contactor. CA5-550 contactors are still available by special order if required for their higher AC1 ratings.

② The CA5-700 & 860 has been replaced by the CA6-630 & 860 contactor. CA5-700 & 860 contactors are available by special order.

A

Electrical Data

CA5

| | | | CA5-550 ① | CA5-700 ② | CA5-860 ② | CA5-1000 | CA5-1200 |
|---|-------------------------|--------|-----------|-----------|-----------|----------|----------|
| Capacitor Ratings | | | | | | | |
| Capacitor Switching - 50Hz | | | | | | | |
| Single Capacitor - 40°C | 230 V | [kVar] | 180 | 220 | 250 | 290 | 330 |
| | 240 V | [kVar] | 200 | 250 | 300 | 325 | 360 |
| | 400 V | [kVar] | 320 | 400 | 450 | 500 | 575 |
| | 415 V | [kVar] | 350 | 430 | 500 | 550 | 630 |
| | 500 V | [kVar] | 450 | 520 | 600 | 660 | 750 |
| | 690 V | [kVar] | 580 | 700 | 800 | 875 | 1000 |
| | Single Capacitor - 55°C | 230 V | [kVar] | 150 | 180 | 220 | 275 |
| 240 V | | [kVar] | 170 | 200 | 260 | 300 | 350 |
| 400 V | | [kVar] | 280 | 330 | 400 | 460 | 550 |
| 415 V | | [kVar] | 300 | 360 | 450 | 500 | 600 |
| 500 V | | [kVar] | 360 | 420 | 540 | 600 | 720 |
| 690 V | | [kVar] | 500 | 580 | 720 | 800 | 950 |
| Capacitor Bank - 40°C | | 230 V | [kVar] | 180 | 220 | 250 | 290 |
| | 240 V | [kVar] | 200 | 250 | 300 | 325 | 300 |
| | 400 V | [kVar] | 320 | 400 | 450 | 500 | 575 |
| | 415 V | [kVar] | 350 | 430 | 500 | 550 | 630 |
| | 500 V | [kVar] | 450 | 520 | 600 | 660 | 750 |
| | 690 V | [kVar] | 580 | 700 | 800 | 875 | 1000 |
| | Capacitor Bank - 55°C | 230 V | [kVar] | 150 | 180 | 220 | 275 |
| 240 V | | [kVar] | 170 | 200 | 260 | 300 | 350 |
| 400 V | | [kVar] | 280 | 330 | 400 | 460 | 550 |
| 415 V | | [kVar] | 300 | 360 | 450 | 500 | 600 |
| 500 V | | [kVar] | 360 | 420 | 540 | 600 | 720 |
| 690 V | | [kVar] | 500 | 580 | 720 | 800 | 950 |
| Short-Circuit Coordination | | | | | | | |
| Short Time Current Withstand Ratings | | | | | | | |
| I_{cw} 60°C | 1 s | [A] | 5500 | 7000 | 8000 | 10000 | 12000 |
| | 4 s | [A] | 5500 | 7000 | 8000 | 10000 | 12000 |
| | 10 s | [A] | 4400 | 5600 | 6900 | 8000 | 9600 |
| | 15 s | [A] | 3800 | 5000 | 6000 | 7400 | 8500 |
| | 60 s | [A] | 2300 | 2800 | 6400 | 4000 | 4800 |
| | 240 s | [A] | 1300 | 1800 | 2000 | 2300 | 2700 |
| | 900 s | [A] | 850 | 1150 | 1350 | 1600 | 1900 |
| Off Time Between Operations | [Min.] | 60 | 60 | 60 | 60 | 60 | |
| Resistance and Watt Loss I_g AC3 | | | | | | | |
| Resistance per power pole | | [mΩ] | 0.11 | 0.1 | 0.08 | 0.06 | 0.05 |
| Watt Loss - 3 power poles | | [W] | 99 | 147 | 177 | 180 | 216 |
| Coil and 3 power poles (including series resistor) | AC | [W] | 110 | 172 | 202 | 250 | 286 |
| | DC | [W] | 109 | 169 | 199 | 240 | 276 |

① The CA5-550 has been replaced by the CA6-420-EI contactor. CA5-550 contactors are still available by special order if required for their higher AC1 ratings.

② The CA5-700 & 860 has been replaced by the CA6-630 & 860 contactor. CA5-700 & 860 contactors are available by special order.

Electrical Data

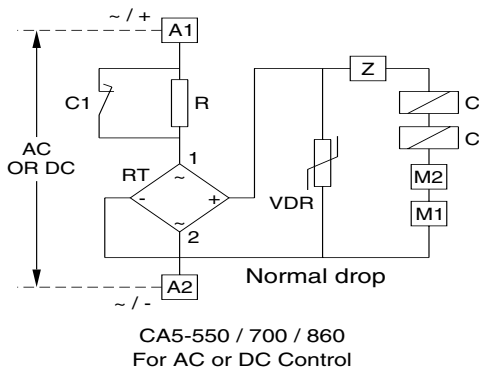
| | | | CA5-550 | CA5-700 | CA5-860 | CA5-1000 | CA5-1200 |
|--------------------------|---------------------|--------------------|--------------------------------|-------------|-------------|------------|------------|
| Coil Data | | | | | | | |
| Voltage Range | | | | | | | |
| AC: 50Hz, 60Hz, 50/60 Hz | Pickup | [xU _s] | 0.85...1.1 | 0.85...1.1 | 0.85...1.1 | 0.85...1.1 | 0.85...1.1 |
| | Dropout | [xU _s] | 0.2...0.5 | 0.20...0.5 | 0.20...0.5 | 0.20...0.5 | 0.1...0.6 |
| DC | Pickup | [xU _s] | 0.85...1.1 | 0.85...1.1 | 0.85...1.1 | 0.85...1.1 | 0.85...1.1 |
| | Dropout | [xU _s] | 0.2...0.5 | 0.20...0.5 | 0.20...0.5 | 0.20...0.5 | 0.1...0.6 |
| Coil Consumption | | | | | | | |
| AC: 50Hz, 60Hz, 50/60 Hz | Pickup | [VA] | 800...950 | 1350...1600 | 1350...1600 | 2400 | 2400 |
| | Hold-in | [VA] | 9...11 | 21...25 | 21...25 | 70 | 70 |
| DC | Pickup | [VA] | 700...850 | 1300...1550 | 1300...1550 | 2100 | 2100 |
| | Hold-in | [W] | 8...10 | 18...22 | 18...22 | 60 | 60 |
| Operating Times | | | | | | | |
| AC: 50Hz, 60Hz, 50/60 Hz | Pickup | [ms] | 50...100 | 50...100 | 50...100 | 50...100 | 50...100 |
| | Normal Dropout | [ms] | 150...200 | 150...200 | 150...200 | 25...50 | 25...50 |
| | Delayed Dropout | [ms] | 500...1000 | 500...1000 | 500...1000 | ~ | ~ |
| | Accelerated Dropout | [ms] | 20...50 | 20...50 | 20...50 | ~ | ~ |
| | DC | Pickup | [ms] | 50...100 | 50...100 | 50...100 | 50...100 |
| DC | Normal Dropout | [ms] | 150...200 | 150...200 | 150...200 | 25...50 | 25...50 |
| | Delayed Dropout | [ms] | 500...1000 | 500...1000 | 500...1000 | ~ | ~ |
| | Accelerated Dropout | [ms] | 20...50 | 20...50 | 20...50 | ~ | ~ |
| Insulation Class | | | Class "B" to VDE 0660 table 22 | | | | |

Control and Magnet System for CA5-550...CA5-860 Contactors

Even though the **input** to the magnet system can either be AC or DC, the low pull-in and holding consumption of the magnet system is achieved by DC operating coils **supplied** by a "Feeder Group". The Feeder Group for these contactors also allows delayed, normal or accelerated dropout times, selectable between 20ms and 1000ms.

- Delayed: (500...1000ms)
- Normal: (150...200ms)
- Accelerated: (20...50ms)

As supplied, the contactors are wired for a normal dropout time. To compensate for wide voltage fluctuations or brief supply voltage interruptions, the dropout time can be delayed by wiring changes made to the Feeder Group at installation.

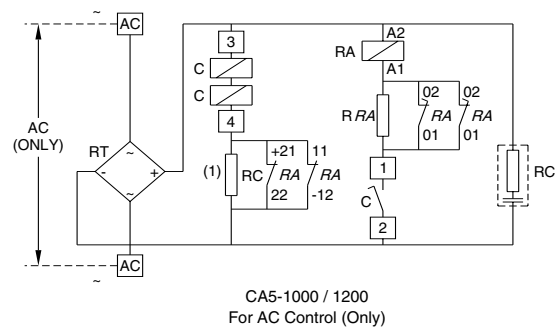


**Coil Circuit for CA5-550, 700 & 860
AC or DC supply**

Control and Magnet System for CA5-1000...CA5-1200 Contactors

Even though the **input** to the magnet system is only designed for AC voltages, the low pull-in and holding consumption of the magnet system is achieved by DC operating coils **supplied** by a "Feeder Group". The Feeder Group for these contactors is configured for a dropout time of 25...50ms. Dropout times for these contactors are not selectable.

Further information regarding circuit possibilities can be obtained from assembly instructions supplied with each device.



**Coil Circuit for CA5-1000 & 1200
AC supply (only)**

- C:** Coil pair
- RA:** D.C. auxiliary relay coil for economy resistor switching
- R, RC, RRA:** Economy resistor
- VDR:** Varistor
- M1, M2:** Terminals for fast-drop connection
- Z:** Device for dropout operating time variation
- (1)** For control voltages up to 125V NC contacts 11-12 & 21-22 are connected in parallel; higher voltages are connected in series

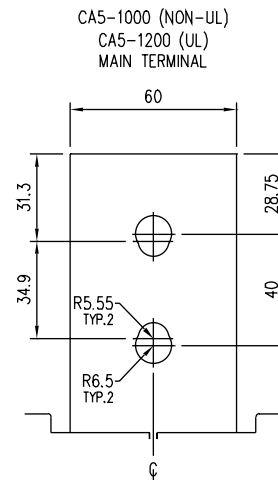
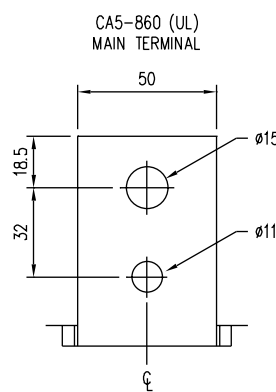
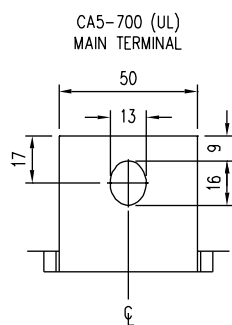
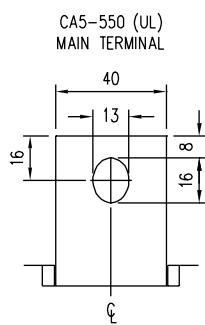
Mechanical Data

| | | | CA5-550 ① | CA5-700 ② | CA5-860 ② | CA5-1000 | CA5-1200 |
|-------------------------|-------------|--------|-----------|-----------|-----------|----------|----------|
| Service Life | | | | | | | |
| Mechanical | AC Control | [Mil.] | 5 | 5 | 5 | 1 | 1 |
| | DC Control | [Mil.] | 5 | 5 | 5 | 1 | 1 |
| Electrical | AC-3 (400V) | [Mil.] | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 |
| Shipping Weights | | | | | | | |
| AC - CA5 | AC Control | [kg] | 13.8 | 26.4 | 28.4 | 50.3 | 53.4 |
| | DC Control | [Lbs] | 30.4 | 58.1 | 62.5 | 110.8 | 117.6 |
| AC - CAU5 | AC Control | [kg] | 28.5 | 53.9 | 57.9 | 102.3 | 108.5 |
| | DC Control | [Lbs] | 63.6 | 120.3 | 129.2 | 228.3 | 242.2 |

Terminations - Power

| Type | | | | | | | | |
|---|----------------|---------|------------------------------------|-------|-------|-------|-------|--|
| | Hexagonal Bolt | | | | | | | |
| Direct Connection (customer supplied connections) | | | | | | | | |
| | b max. | [mm] | 50 | 60 | 60 | 60 | 60 | |
| | c max. | [mm] | 20 | 20 | 25 | 25 | 25 | |
| | s max. | [mm] | 2 x 5 | 2 x 5 | 2 x 6 | 2 x 6 | 2 x 8 | |
| | Ø min. | [mm] | Refer to CA5 stab dimensions below | | | | | |
| Recommended Torque | | [Nm] | 50 | 60 | 75 | 60 | 60 | |
| | | [Lb-ft] | 37 | 44 | 55 | 44 | 44 | |






CA5 Stab Dimensions



[ALL DIMENSIONS IN MILLIMETERS]

- ① The CA5-550 has been replaced by the CA6-420-EI contactor. CA5-550 contactors are still available by special order if required for their higher AC1 ratings.
- ② The CA5-700 & 860 has been replaced by the CA6-630 & 860 contactor. CA5-700 & 860 contactors are available by special order.

Mechanical Data (continued)

| | CA5-550 ❶ | CA5-700 ❷ | CA5-860 ❷ | CA5-1000 | CA5-1200 |
|---|--|---|---|---|---|
| Terminations - Control |  |  |  |  |  |
| Description | Combination Screw Head: Cross, Slotted, Pozidrive | | | | |
| Coils | 1 or 2 | [mm2] | 4 | | |
| Wires | | [AWG] | 25 | | |
| Control Modules | 1 or 2 | [mm2] | 4 | | |
| Wires | | [AWG] | 25 | | |
| Torque Requirement | | [Nm] | 1...2.5 | | |
| | | [Lb-in] | 8.9...22 | | |
| Degree of Protection - contactor | IP00 (open) per IEC 529 and DIN 40 050 | | | | |
| Environmental and General Specifications | | | | | |
| Rated Isolation Voltage U_i | | | | | |
| IEC, AS, BS, SEV, VDE 0660 | [V] | 1000V | | 690V | |
| UL/CSA | [V] | 600V | | 600V | |
| Impulse Voltage - U_{imp} | | | | | |
| 1 minute per IEC 60947-1 | [kV] | 3500V | | 2500V | |
| Ambient Temperature | | | | | |
| Storage | -40...+80° C (-13...176° F) | | | | |
| Operation at rated current | -25...+60° C (-13...140° F) | | | | |
| Operation at 90% of rated current | -25...+60° C (-13...140° F) | | | | |
| Operation at 85% of rated current | -25...+65° C (-13...149° F) | | | | |
| Altitude at installed site | 2000 meters above sea level per IEC 60947-1 | | | | |
| Operating Frequency for AC Loads | 180/Hr. for 0.25, start time 42/ HR for 1s start time | | | | |
| 50/60 Hz | | | | | |
| Resistance to Corrosion / Humidity | Damp-alternating climate: cyclic per DIN 50 016 and 40 046 Part 38 IEC 68 | | | | |
| | Dry heat: IEC 68-2, + 100°C (212° F), relative humidity ,50%, 7 days | | | | |
| | Damp tropical: IEC 68-2, +40°C (104°F), relative humidity 95%, 56 days ❸ | | | | |
| Operating Position | See dimensions page | | | | |
| Standards | UL (CA5-700, 860, 1200); IEC 60947-4; VDE 0660; NEMA; ICS BS 5424; UTE NF C 63-110 | | | | |
| Approvals | Lloyd's registry of shipping, CE, UL, cUL | | | | |

❶ The CA5-550 has been replaced by the CA6-420-EI contactor. CA5-550 contactors are still available by special order if required for their higher AC1 ratings.
 ❷ The CA5-700 & 860 has been replaced by the CA6-630 & 860 contactor. CA5-700 & 860 contactors are available by special order.
 ❸ Per DIN 50 016 and 40 046, part 38.





Auxiliary Contacts

| Switching, AC & DC Loads | Auxiliary Contact Block CA5-EF22 | | | | | | | | Auxiliary Contact Blocks CA5-EB11, CA5-EB11DC | | | | | | | |
|--|-------------------------------------|--------|-----|-----|-----|-----|-----|-----|--|-----|-----|-----|-----|-----|-----|--|
| | AC- I_{th} at 40°C | [A] 16 | | | | | | | | 30 | | | | | | |
| at 60°C | [A] 12 | | | | | | | | 20 | | | | | | | |
| AC-15, switching electromagnetic loads at: | [V] | 120 | 230 | 240 | 400 | 415 | 500 | 690 | 120 | 230 | 240 | 400 | 415 | 500 | 690 | |
| | [A] | 6 | 3 | 3 | 2 | 2 | 1.5 | 1 | 6 | 3 | 3 | 2 | 2 | 1.5 | 1 | |
| DC-13, switching DC electromagnets at: | [V] | 24 | | 48 | 110 | | 220 | | 24 | | 48 | 110 | | 220 | | |
| | [A] | 6 | | 3 | 1 | | 0.5 | | 6 | | 3 | 1 | | 0.5 | | |

Short-Circuit Protection - gGFuse

| | | | |
|---------------------|-----|----|----|
| Type 2 Coordination | [A] | 10 | 16 |
|---------------------|-----|----|----|

Terminals

| Terminal Type | |  |  |
|--|--------------------------------|---|---|
| Maximum Wire Size per IEC 947-1 | | 2 x A4 | 2 x A4 |
|  Flexible with Wire-End Fernule | 1 Conductor [mm ²] | 1...4 | 0.5...2.5 |
| | 2 Conductor [mm ²] | 1...4 | 0.75...2.5 |
|  Solid/Stranded-Conductor | 1 Conductor [mm ²] | 1.5...6 | 0.5...2.5 |
| | 2 Conductor [mm ²] | 1.5...6 | 0.75...2.5 |
| Recommended Tightening Torque | [Nm] | 1...25 | 1...1.5 |
| Max. Wire Size per UL/CSA | [AWG] | 16...10 | 18...14 |
| Recommended Tightening Torque | [lb-in] | 8.9...22 | 8.9...13.3 |

Degree of Protection

IP2LX per IEC 529 and DIN 40 050

Mechanical Latch

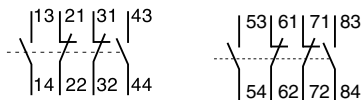
| | CA5-AM5 | CA5-AM6 | CA5-AM7 |
|--|-----------|-----------|-----------|
| Service Life | | | |
| Mechanical [Mil ops.] | 0.5 | 0.5 | 0.5 |
| Dropout Delay | | | |
| Contact Latch [ms] | 50...70 | 50...70 | 50...70 |
| Trip Coil | | | |
| Consumption AC [VA] | 950 | 1600 | 3500 |
| DC [W] | 500 | 800 | 3200 |
| OFF-command (min. impulse duration) [ms] | 200 | 200 | 200 |
| Operation Voltage | | | |
| Minimum | 0.5 U_n | 0.5 U_n | 0.5 U_n |
| Maximum | 1.1 U_n | 1.1 U_n | 1.1 U_n |

Auxiliary Contacts

For CA5-700 & CA5-860 contactors

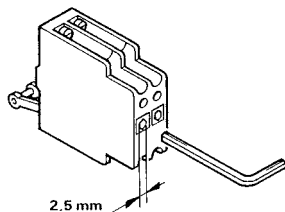
Up to two auxiliary contact blocks can be mounted on each contactor. One four-pole auxiliary contact block (CA5-EF22) is supplied standard and is installed on the contactor between T1 and T2. One additional auxiliary contact block can be installed between T2 and T3.

Each CA5-EF22 contains 2 NO and 2 NC adjustable auxiliary contacts. Standard terminal markings are shown below on the left. If an additional contact block is required, different terminal markings (right) are supplied and may be applied by the user.

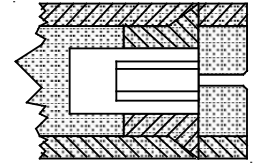
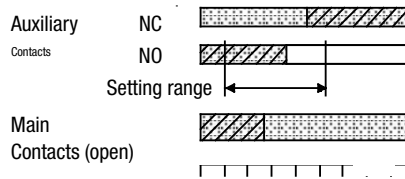


Adjustable Auxiliary Contacts

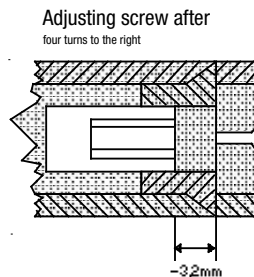
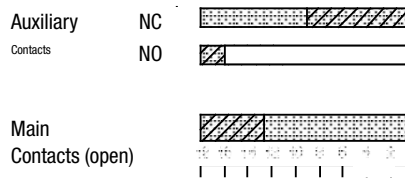
The instant at which the NO contact closes, in relation to the main contacts, can be adjusted from the front of the CA5-EF22 auxiliary contact block by means of an Allen wrench. The following diagrams show the adjustments for Normal, Delayed and Overlapping auxiliary contacts.



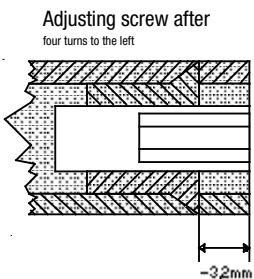
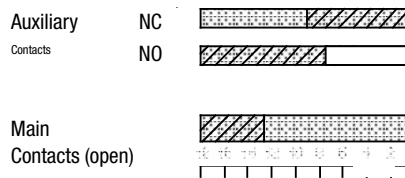
Normal Setting (from factory)



Delayed NO Contact



Overlapping NO and NC Contacts



For CA5-1000 and CA5-1200 contactors

Up to four nonadjustable auxiliary contact blocks can be mounted on each contactor. One CA5-EB11 two pole aux contact and one CA5-EB11DC two pole aux contact come standard. The CA5-EB11DC has 1 NC contact (available) and 1 NO Delayed Make (unavailable) which is used for the operation of the coil feeder group.

- CA5-EB11 – 1 NO/1NC
- CA5-EB11DC – 1 NO Delayed Make/1 NC

Determining Contact Life

To determine the contactor's estimated electrical life, follow these guidelines:

1. Identify the appropriate Utilization Category from Table A.
2. On the following pages, choose the graph for the Utilization Category selected.

3. Locate the Rated Operational Current (I_e) along the bottom of the chart and follow the graph lines up to the intersection of the appropriate contactor's life-load curve.
4. Read the estimated contact life along the vertical axis.

Table A – IEC Special Utilization Categories, AC Ratings ①

| Category | Typical Applications | Rated Current | Conditions for testing electrical life | | | | | | Ops. | Conditions for testing making and breaking capacity | | | | | | Ops. | |
|------------------------|--|--|--|---------------------|--------|-----------|-----------|--------|------|---|---------|--------|-----------|-----------|--------|------|----|
| | | | Make | | | Break | | | | Make | | | Break | | | | |
| | | | I/I_e | U/U_e | \cos | I_c/I_e | U_r/U_e | \cos | | I/I_e | U/U_e | \cos | I_c/I_e | U_r/U_e | \cos | | |
| AC-1 | Non-inductive or slightly inductive loads, resistance furnaces | All values | 1 | 1 | 0.95 | 1 | 1 | 0.95 | 6000 | 1.5 | 1.05 | 0.8 | 1.5 | 1.05 | 0.8 | 50 | |
| AC-2 | Slip-ring motors: Starting, plugging | All values | 2 | 1.05 | 0.65 | 2 | 1.05 | 0.65 | 6000 | 4 | 1.05 | 0.65 | 4 | 1.05 | 0.65 | 50 | |
| AC-3 | Squirrel-cage motors: Starting, switching off motors | $I_e \leq 17Amp$ | 6 | 1 | 0.65 | 1 | 0.17 | 0.65 | 6000 | 10 | 1.1 | 0.65 | 8 | 1.1 | 0.65 | 50 | |
| | | $17Amp < I_e \leq 100Amp$ | 6 | 1 | 0.35 | 1 | 0.17 | 0.35 | | 10 | 1.1 | 0.35 | 8 | 1.1 | 0.35 | | |
| | | $I_e > 100Amp$ | 6 | 1 | 0.35 | 1 | 0.17 | 0.35 | | 8 ② | 1.1 | 0.35 | 6 ③ | 1.1 | 0.35 | | |
| AC-4 | Squirrel-cage motors: Starting, plugging, inching ⑤ | $I_e \leq 17Amp$ | 6 | 1 | 0.65 | 6 | 1 | 0.65 | 6000 | 12 | 1.1 | 0.65 | 10 | 1.1 | 0.65 | 50 | |
| | | $17Amp < I_e \leq 100Amp$ | 6 | 1 | 0.35 | 6 | 1 | 0.35 | | 12 | 1.1 | 0.35 | 10 | 1.1 | 0.35 | | |
| | | $I_e > 100Amp$ | 6 | 1 | 0.35 | 6 | 1 | 0.35 | | 10 ④ | 1.1 | 0.35 | 8 ② | 1.1 | 0.35 | | |
| AC-5a | Switching of electric discharge lamp control | | 2 | 1.05 | 0.45 | 2 | 1.05 | 0.45 | 6000 | 3 | 1.05 | 0.45 | 3 | 1.05 | 0.45 | 50 | |
| AC-5b | Switching of incandescent lamps | | 1 | 1.05 | | 1 | 1.05 | | | 1.5 | 1.05 | | | | | | |
| AC-6a | Switching of transformers | | | | | | | | | Rating derived from AC-3 rating (x 0.45) | | | | | | | |
| AC-6b | Switching of capacity banks | | | | | | | | | Depends on circuit conditions of application | | | | | | | |
| AC-12 | Control of resistive loads and solid state loads with isolation by opto couplers | All values | 1 | 1 | 0.9 | 1 | 1 | 0.9 | 6050 | | | | | | | | |
| CONTROL DEVICES | AC-13 | Control of solid state loads with transformer isolation | | 2 | 1 | 0.65 | 1 | 1 | 0.65 | 6050 | 10 | 1.1 | 0.65 | 1.1 | 1.1 | 0.65 | 10 |
| | AC-14 | Control of small electromagnetic loads | 72 VA | 6 | 1 | 0.3 | 1 | 1 | 0.3 | 6050 | 6 | 1.1 | 0.7 | 6 | 1.1 | 0.7 | 10 |
| | AC-15 | Control of electromagnetic loads | 72 VA | 10 | 1 | 0.3 | 1 | 1 | 0.3 | 6050 | 10 | 1.1 | 0.3 | 10 | 1.1 | 0.3 | 10 |
| | AC-20 | Connecting and disconnecting under no load conditions | | No testing required | | | | | | | | | | | | | |
| SWITCHES | AC-21 | Switching of resistive loads, including moderate loads | All values | 1 | 1 | 0.95 | 1 | 1 | 0.95 | 10000 | 1.5 | 1.05 | 0.95 | 1.5 | 1.05 | 0.95 | 5 |
| | AC-22 | Switching of mixed resistive & inductive loads, including moderate overloads | All values | 1 | 1 | 0.8 | 1 | 1 | 0.8 | 10000 | 3 | 1.05 | 0.65 | 3 | 1.05 | 0.65 | 5 |
| | AC-23 | Switching of motor loads or other highly inductive loads | All values | 1 | 1 | 0.65 | 1 | 1 | 0.65 | 10000 | 10 | 1.05 | 0.45 | 8 | 1.05 | 0.45 | 5 |

Legend

- U_e Rated operational voltage
- U Voltage before make
- U_r Recovery voltage
- I_e Rated operational current
- I Making current
- I_c Breaking current
- L Inductance of test circuit
- R Resistance of test circuit

- ① Utilization categories and test conditions for AC & DC. For contactors according to IEC 158-1, starters according to IEC 292-1 ... 4 and control switches according to IEC 337-1 and IEC 337-1A.
- ② With a minimum value of 1000A for I or I_c .
- ③ With a minimum value of 800A for I_c .
- ④ With a minimum value of 1200A for I .
- ⑤ Plugging is understood as stopping or reversing the motor rapidly by reversing the motor primary connections while the motor is running. Inching [or jogging] is understood as energizing a motor once or repeatedly for short periods to obtain small movements of the driven mechanism.

Determining Contact Life

To determine the contactor's estimated electrical life, follow these guidelines:

1. Identify the appropriate Utilization Category from Table A.
2. On the following pages, choose the graph for the Utilization Category selected.
3. Locate the Rated Operational Current (I_e) along the bottom of the chart and follow the graph lines up to the intersection of the appropriate contactor's life-load curve.
4. Read the estimated contact life along the vertical axis.

Table A – IEC Special Utilization Categories, DC Ratings ①

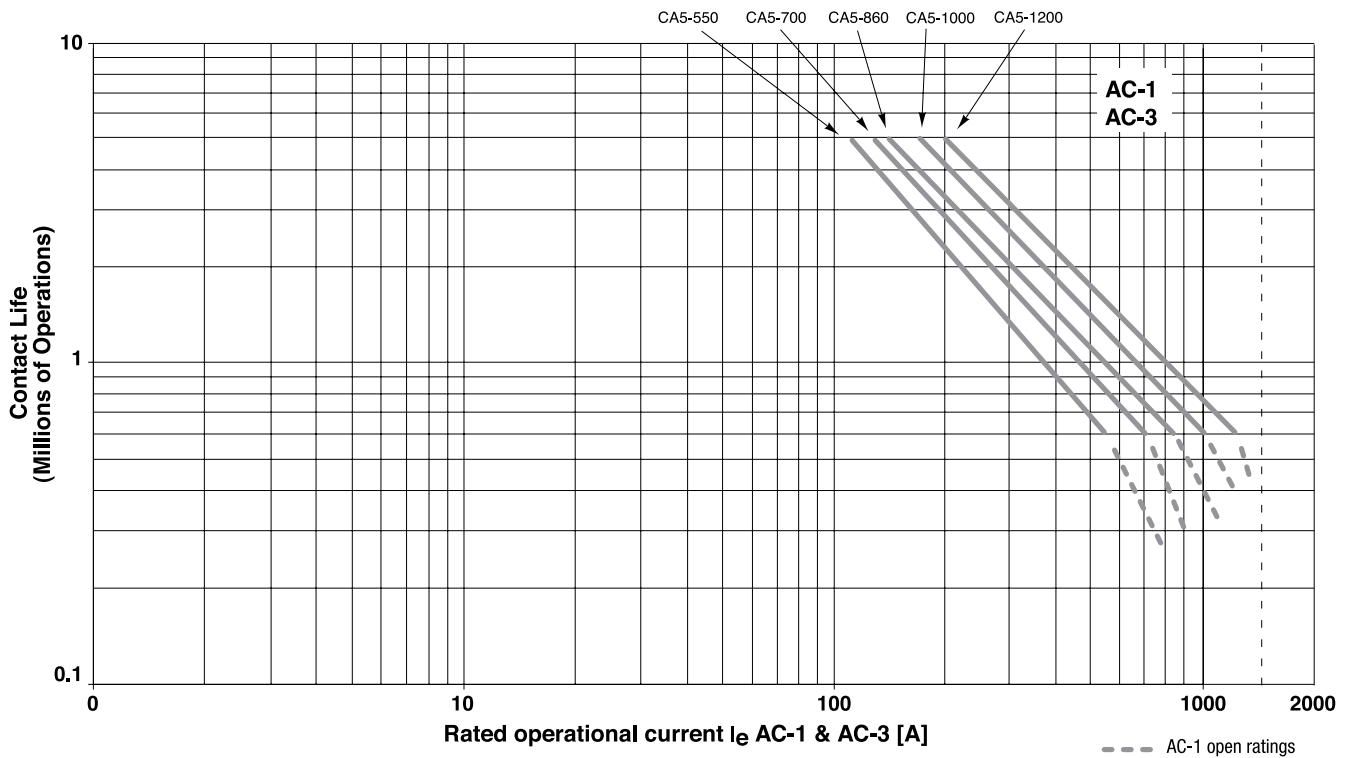
| Category | Typical Applications | Rated Current | Conditions for testing electrical life | | | | | | Ops. | Conditions for testing making and breaking capacity | | | | | | Ops. |
|----------|--|---------------|--|---------|---------|-----------|-----------|---------|------|---|---------|---------|-----------|-----------|---------|------|
| | | | Make | | | Break | | | | Make | | | Break | | | |
| | | | I/l_e | U/U_e | \cos | I_c/l_e | U_r/U_e | \cos | | I/l_e | U/U_e | \cos | I_c/l_e | U_r/U_e | \cos | |
| DC-1 | Non-inductive or slightly inductive loads, resistance furnaces | All values | 1 | 1 | 1 | 1 | 1 | 1 | | 1.5 ② | 1.1 ② | 1 ② | 1.5 ② | 1.1 ② | 1 ② | |
| DC-2 | Shunt-motors: Starting, switching off motors during running | All values | 2.5 | 1 | 2 | 1 | 0.1 | 7.5 | | 4 | 1.1 | 2.5 | 4 | 1.1 | 2.5 | |
| DC-3 | Shunt-motors: Starting, plugging, inching | All values | 2.5 | 1 | 2 | 2.5 | 1 | 2 | | 4 | 1.1 | 2.5 | 4 | 1.1 | 2.5 | |
| DC-4 | Series-motors: Starting switching off motors during running | All values | 2.5 | 1 | 7.5 | 1 | 0.3 | 10 | | 4 | 1.1 | 15 | 4 | 1.1 | 15 | |
| DC-5 | Series-motors: Starting, plugging, inching | All values | 2.5 | 1 | 7.5 | 2.5 | 1 | 7.5 | | 4 | 1.1 | 15 | 4 | 1.1 | 15 | |
| DC-15 | Electromagnets for contactors, valves, solenoid actuators | All values | 1 | 1 | 6 x P ③ | 1 | 1 | 6 x P ③ | | 1.1 | 1.1 | 6 x P ③ | 1.1 | 1.1 | 6 x P ③ | |

Legend

- U_e** Rated operational voltage
- U** Voltage before make
- U_r** Recovery voltage
- I_e** Rated operational current
- I** Making current
- I_c** Breaking current
- L** Inductance of test circuit
- R** Resistance of test circuit

- ① Utilization categories and test conditions for AC & DC. For contactors according to IEC 158-1, starters according to IEC 292-1 ... 4 and control switches according to IEC 337-1 and IEC 337-1A.
- ② Only according to VDE.
- ③ **$P = U_e \times I_e$** rated power [W]. The value "6 x P" has been derived from an empiric relationship which covers most magnetic loads for DC up to an upper limit of $P = 50W$.

Life-Load Curves



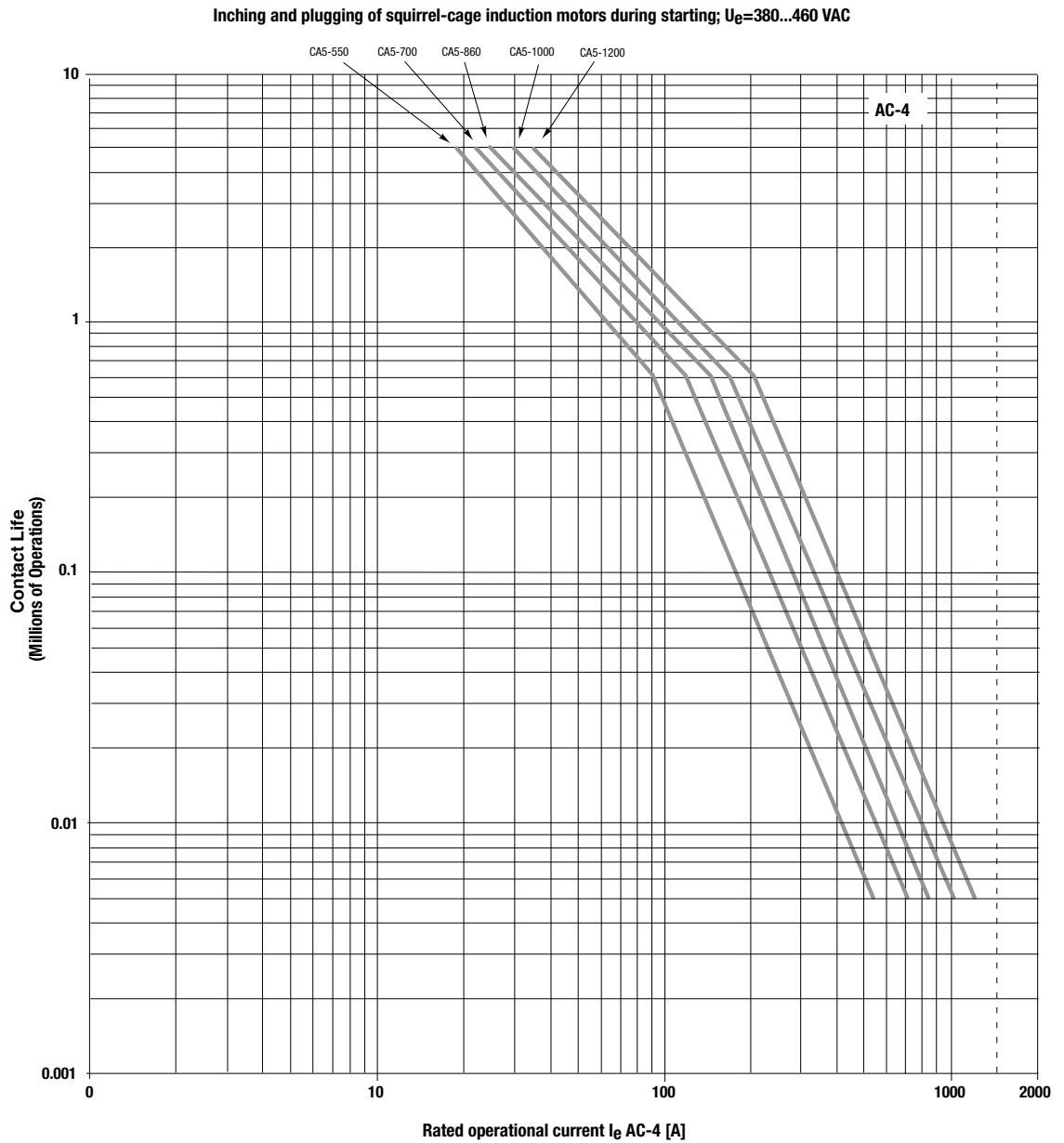
AC-1 - Non or slightly inductive loads, resistive furnaces; $U_e=380...460$ VAC
 AC-3 - Switching squirrel-cage induction motors during starting; $U_e=380...460$ VAC

**INSTRUCTIONS ON
 "HOW TO READ"
 LIFE CURVES CAN BE
 FOUND ON PG. 57.**

NOTE: The life-load curves shown here are based on Sprecher+Schuh tests according to the requirements defined in IEC 947-4-1. Since contact life in any given application is dependent on environmental conditions and duty cycle, actual application contact life may vary from that indicated by the curves shown here.

Life-Load Curves

AC-4



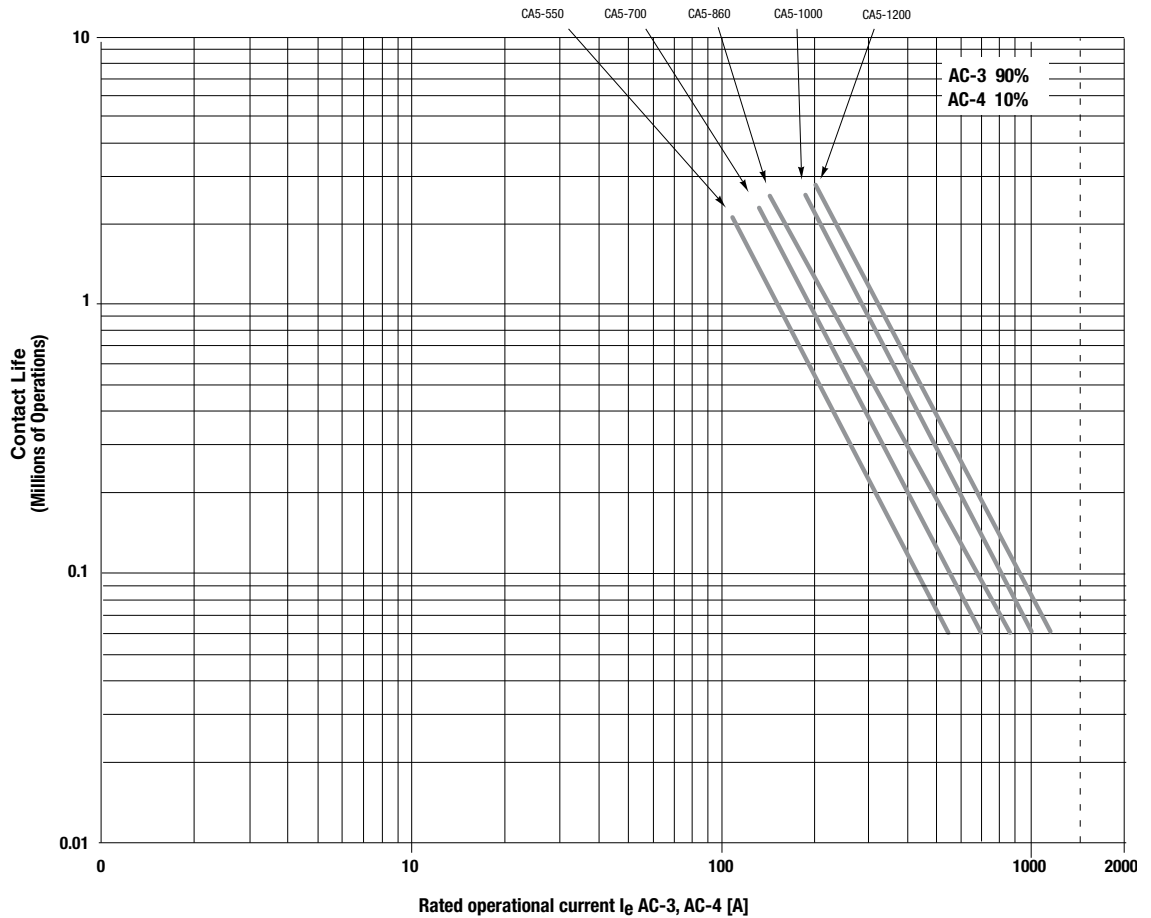
A
Contactors
CA5

NOTE: The life-load curves shown here are based on Sprecher+Schuh tests according to the requirements defined in IEC 947-4-1. Since contact life in any given application is dependent on environmental conditions and duty cycle, actual application contact life may vary from that indicated by the curves shown here.

Life-Load Curves

AC-3 (90%),
AC-4 (10%)

Mixed operation with squirrel-cage induction motors
AC-3 - 90% starting and stopping of running motors; $U_e=380...460$ VAC
AC-4 - 10% starting with inching and plugging; $U_e=380...460$ VAC



**Contact Life for Mixed Utilization Categories
AC-3 and AC-4**

In many applications, the utilization category cannot be defined as either purely AC-3 or AC-4. In those applications, the electrical life of the contactor can be estimated with the following equation:

$$L_{mixed} = L_{ac3} / [1 + P_{ac4} \times (L_{ac3} / L_{ac4} - 1)], \text{ where:}$$

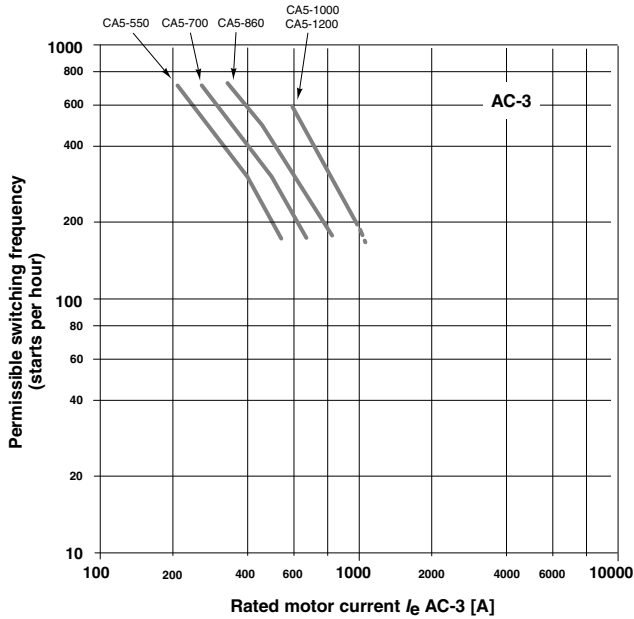
- L_{mixed} Approximate contact life in operations for a mixed AC-3/AC-4 utilization category application.
- L_{ac3} Approximate contact life in operations for a pure AC-3 utilization category (from the AC-3 life-load curve).
- L_{ac4} Approximate contact life in operations for a pure AC-4 utilization category (from the AC-4 life-load curve).
- P_{ac4} Percentage of AC-4 operations

NOTE: The life-load curves shown here are based on Sprecher+Schuh tests according to the requirements defined in IEC 947-4-1. Since contact life in any given application is dependent on environmental conditions and duty cycle, actual application contact life may vary from that indicated by the curves shown here.

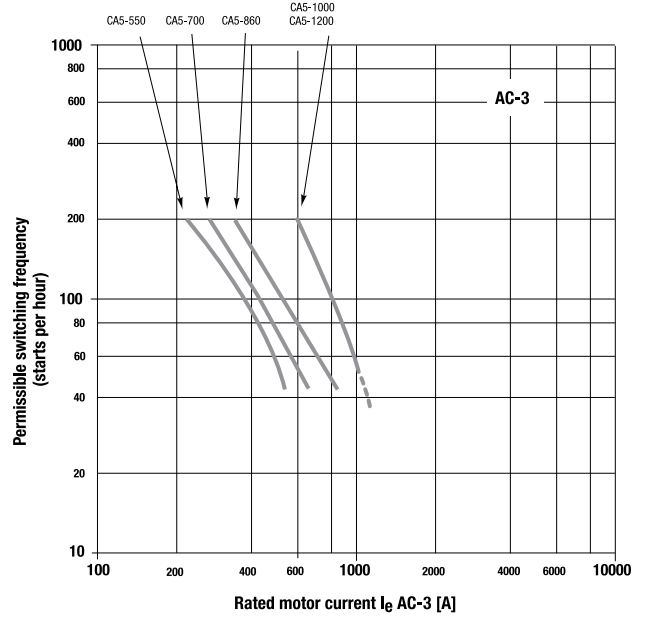
Operating Rate Curves

AC-3

Starting and stopping of running motors
Starting time $t_A = 0.25$ s
Relative time energized 40%

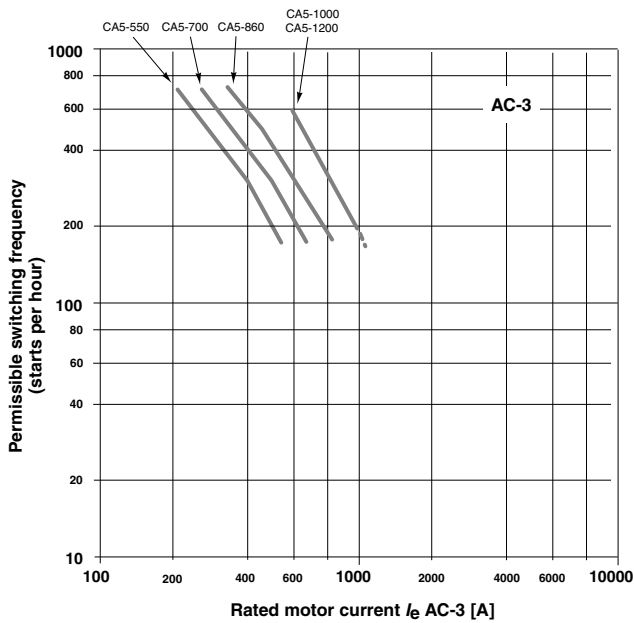


Starting time $t_A = 1$ s

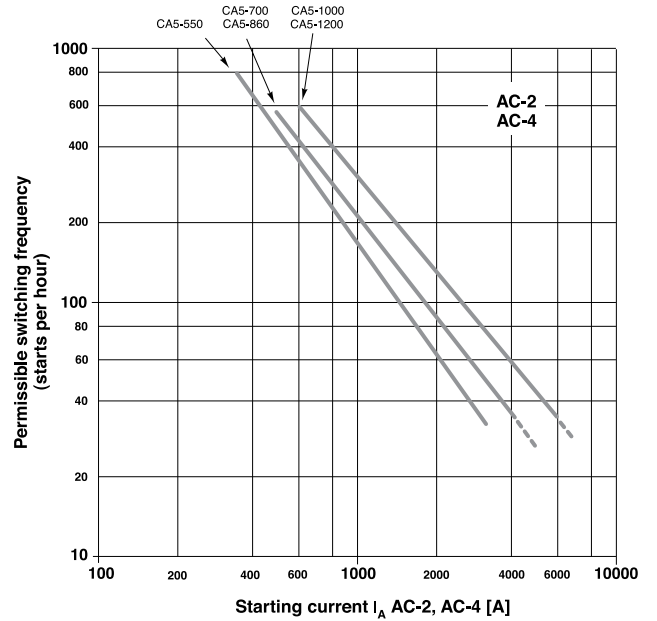


AC-2/AC-4

Starting and stopping of running motors
Starting time $t_A = 0.25$ s
Relative time energized 40%

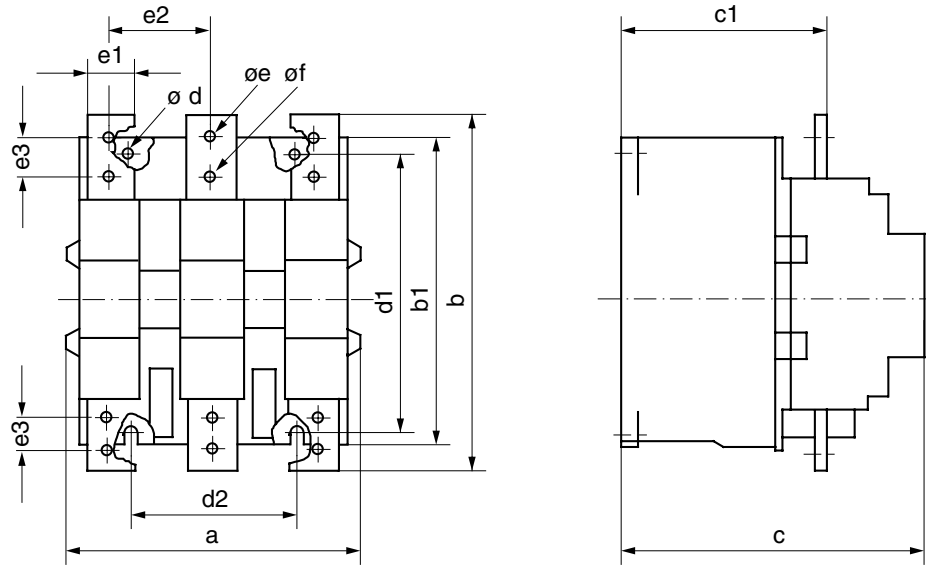


Switching motors during running (AC2, AC4)
Time energized $t_{ED} = 0.25$ s ($< t_A$)



Series CA5 & Series CAU5 (Contactors & Reversing Contactors)

- Dimensions are in millimeters (inches)
- Dimensions not intended for manufacturing purposes



| Type | a | b | b1 | c | c1 | ød | d1 | d2 | øe | øf | e1 | e2 | e3 |
|-----------|------------------|------------------|-------------------|-------------------|-----------------|---------------|-------------------|------------------|---------------|---------------|-----------------|------------------|-----------------|
| CA 5-550 | 220 (8-21/32) | 258 (10-5/32) | 228 (8-31/32) | 225 (8-7/8) | 164 (6-7/16) | 9 (3/8) | 220 (8-21/32) | 110 (4-5/8) | 13 (17/32) | - | 40 (1-19/32) | 79 (3-1/8) | - |
| CA 5-700 | 280 (11-1/32) | 307 (12-3/32) | 277 (10-29/32) | 291 (11-15/32) | 203 (8) | 11 (7/16) | 280 (11-1/32) | 175 (6-7/8) | 13 (17/32) | - | 50 (1-31/32) | 101 (4) | - |
| CA 5-860 | 280 (11-1/32) | 361 (14-7/32) | 325 (12-25/32) | 291 (11-15/32) | 203 (8) | 11 (7/16) | 280 (11-1/32) | 175 (6-7/8) | 15 (19/32) | 11 (7/16) | 50 (1-31/32) | 101 (4) | 32 (1-17/64) |
| CA 5-1000 | 334 (13-5/32) | 490 (19-9/32) | 434 (17-1/16) | 345 (13-9/16) | 231 (9/32) | 13 (25/64) | 380 (14-31/32) | 120 (4-23/32) | 13 (25/64) | 13 (25/64) | 60 (2-3/8) | 100 (3-31/32) | 40 (1-9/16) |
| CA 5-1200 | 334 (13-5/32) | 490 (19-9/32) | 434 (17-1/16) | 345 (13-9/16) | 231 (9/32) | 13 (25/64) | 380 (14-31/32) | 120 (4-23/32) | 13 (25/64) | 13 (25/64) | 60 (2-3/8) | 100 (3-31/32) | 40 (1-9/16) |

Reversing Contactors & Accessories

| Contactor with... | Dimension [mm] | Dimension [inches] |
|--|----------------|----------------------|
| - auxiliary contact block | a | a |
| - reversing contactors with mechanical interlock | | |
| next to each other | | |
| CA 5-550-/CA 5-550 | a+42+a | a+1-23/32+a |
| CA 5-700, -860/ CA 5-700, -860 | a+32+a | a+1-1/4+a |
| CA 5-1000, -1200/ CA 5-1000, -1200 | a+46+a | a+1-13/16+a |
| CA 5-550/CA, 5-700, -860 | a+37+a | a+1-15/32+a |
| CA 5-700, -860/ CA 5-1000, -1200 | a+73+a | a+2-7/8+a |
| above each other | | |
| CA 5-550-/CA 5-550 | b+56+b | b+2-3/16+b |
| CA 5-700, -860/ CA 5-700, -860 | b+100...200+b | b+3-15/16...7-7/8+b |
| CA 5-1000, -1200/ CA 5-1000, -1200 | b+230...280+b | b+9-1/16...11-1/32+b |
| CA 5-550/CA, 5-700, -860 | b+100...200+b | b+3-15/16...7-7/8+b |
| CA 5-700, -860/ CA 5-1000, -1200 | b+230...280+b | b+9-1/16...11-1/32+b |
| four main contacts | | |
| CA 5-550-/CA 5-700, -860 | a+68 | a+2-11/16 |
| CA 5-1000, -1200 | a+76 | a+3 |
| latch | | |
| CA 5-550 | b+47 | b+1-7/8 |
| CA 5-700 | b+64 | b+2-17/32 |
| CA 5-860 | b+37 | b+1-15/32 |
| CA 5-1000, -1200 | a+30 | a+1-3/16 |

Mounting Position

