Application Information and Technical Data (Continued)

## Control Transformers—Where to Use

It is often desirable to use a control transformer in conjunction with a magnetic starter or controller to provide low voltage control.

## Description—Factory Wired

A transformer, with sufficient capacity for the control circuit, mounted with the starter can be supplied by the factory for the majority of transformer ratings and types of enclosures.

## Coil Suffix

(THIS TABLE IS TO BE USED FOR STARTER FORMS WITHOUT CONTROL TRANSFORMERS.)
Indicates voltage and frequency of operating coils. For use in ordering full voltage starters and contactors, Sizes 00-6, with other coil ratings than those shown in listing on pages 1-11 to 1-124.

| Frequency (Hertz) | 24V | 115-120V[5] | 200-208V[5] | 230-240V[5] | 265-277V | 460-480V[5] | 575-600V[5] |
|---|---|---|---|---|---|---|---|
| 60 | 24 | 02 | 23 | 03 | 13 | 04 | 05 |
| **Frequency (Hertz)** | — | **110V** | — | **220V** | **380-415V** | **440V** | **550V** |
| 50 | — | 02 | — | 03 | 64 | 04 | 05 |

**Note:** The 02 coil suffix (115-120V, 60 Hz/110V, 50 Hz) supersedes the 22 coil suffix (120V, 60 Hz).

[5] Suffix shown for this voltage is part of Product Number in magnetic starter-contactor listings.

## Auxiliary Contact Ratings—NEMA Size 0-9

| | Amperes | | |
|---|---|---|---|
| AC Volts | Continuous | Make | Break |
| 115 | 10 | 60 | 6.0 |
| 230 | 10 | 30 | 3.0 |
| 460 | 10 | 15 | 1.5 |
| 575 | 10 | 12 | 1.2 |
| **DC Volts** | | | |
| 125 | 10 | — | 1.1 |
| 250 | 10 | — | 0.5 |

## Contactor DC Ratings

| | | | Interrupting Ratings | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Inductive Amps @125V | | Inductive Amps @250V | | Noninductive Amps @125V | | Noninductive Amps @250V | |
| NEMA Size | No. of Poles in Series | Continuous Current Rating | N.O. | N.C. | N.O. | N.C. | N.O. | N.C. | N.O. | N.C. |
| 00 | 1 | 9 | 2.5 | 2.5 | 0.6 | 0.5 | 5 | 4 | 1 | 0.8 |
| 00 | 2 | 9 | 7 | 7 | 1.2 | 1.2 | 25 | 25 | 5 | 4 |
| 00 | 3 | 9 | 14 | 14 | 3.5 | 3.5 | 35 | 35 | 15 | 15 |
| 00 | 4 | 9 | 25 | 25 | 7 | 7 | 50 | 50 | 50 | 50 |
| 0 | 1 | 18 | 2.8 | 2.5 | 0.7 | 0.5 | 6 | 4.5 | 1.1 | 0.9 |
| 0 | 2 | 18 | 7 | 7 | 1.5 | 1.2 | 35 | 25 | 6 | 4.5 |
| 0 | 3 | 18 | 14 | 14 | 3.5 | 3.5 | 50 | 35 | 25 | 25 |
| 0 | 4 | 18 | 25 | 25 | 7 | 7 | 90 | 60 | 60 | 55 |
| 1 | 1 | 27 | 3 | 2.5 | 0.7 | 0.5 | 6.5 | 4.5 | 1.2 | 0.9 |
| 1 | 2 | 27 | 7 | 7 | 1.5 | 1.2 | 50 | 25 | 7 | 4.5 |
| 1 | 3 | 27 | 14 | 14 | 3.5 | 3.5 | 70 | 35 | 35 | 25 |
| 1 | 4 | 27 | 25 | 25 | 7 | 7 | 120 | 60 | 70 | 55 |
| 2 | 2 | 45 | 7 | | 1.5 | | 60 | | 9 | |
| 2 | 3 | 45 | 14 | | 3.5 | | 120 | | 40 | |
| 2 | 4 | 45 | 25 | | 7 | | 160 | | 80 | |
| 3 | 2 | 90 | 7 | | 2.2 | | 600 | | 300 | |
| 3 | 3 | 90 | 14 | | 4.5 | | 600 | | 600 | |
| 3 | 4 | 90 | 25 | | 9 | | 600 | | 600 | |
| 4 | 2 | 135 | 7 | | 2.2 | | 600 | | 300 | |
| 4 | 3 | 135 | 14 | | 4.5 | | 600 | | 600 | |
| 4 | 4 | 135 | 25 | | 9 | | 600 | | 600 | |

# NEMA Rated Full Voltage Starters - Magnetic

## CR306, CR386 Magnetic Starters

Nonreversing
1600 Horsepower Maximum
NEMA Sizes 00-9
600 Volts Maximum
50/60 Hertz

### Basic 300-Line Features

GE's full voltage (600-Volt maximum) magnetic motor starter has an encapsulated coil and a 3-leg overload relay to protect against overloads in all phases. It is on standard specifications of major manufacturers. The line offers features and benefits most asked for by users.

Forms available include reversing and nonreversing, two-speed, and combination, sizes 00-9.

—**Toolless contactor disassembly (Sizes 00-4)—**allows quick access for inspection and maintenance. Just release two retainers and pull a clip to get at magnet, coil, and contacts.

—**Saddle clamp terminals (Sizes 00-1)—**accommodate ring, spade, and stripped wire leads and carry permanent stamped-in identification. Staggered arrangement makes wiring easier and helps prevent shorting between phases.

—**Current-carrying components—**contact tips are weld-resistant silver cadmium oxide (fine silver on sizes 00 and 0 only). Contacts are installed in a wedge configuration for positive make with minimum bounce.

—**Optional PF capacitor terminals—**permit easy connection of power factor correction capacitors between contactor and overload relay for energy conservation.

—**Class 20 overload protection.**

—**Visual trip indicator with manual reset—**to avoid surprise restarts. Reset occurs on arm upstroke so a tripped condition can't be overridden by holding the arm down.

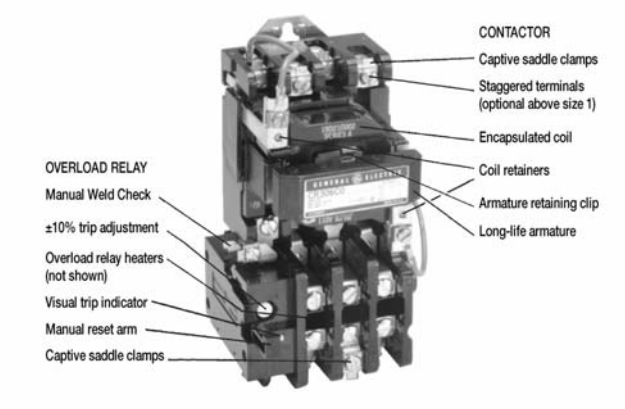
—**Manual weld check—**provides a convenient test against welding of overload relay contacts. Just depress the weld check operator to trip the relay, run a simple continuity test across the relay contacts, then depress the manual reset to return the starter to service.

—**Optional Isolated NO contact on the overload relay—**provides means of direct interface with programmable controller or computer to monitor performance and diagnose faults.

—**Dual bimetals—**anticipate overloads, responding to rising current and temperature with faster tripping on severe overloads for better motor protection. Trip points are factory-calibrated for accuracy.

—**±10% trip adjustment—**by turning a dial in the overload relay face allows "tuning" the protection to the motor on the spot.

—**Largest selection of modifications and accessory kits—** includes auxiliary contacts, coils, fifth-pole addition, vertical and horizontal mechanical interlocks, surge suppressors, control circuit fusing, NEMA Type enclosures, push buttons, selector switches, indicating lights, control transformers, space heaters, and more.




Typical Size 1 Motor Starter

CR306 Size 1 Motor Starter with Solid-State Overload Relay installed

### Technical Features — Solid-State Overload

—2:1 Adjustable full load amps with tactile feedback dial
—Selectable 10/20/30 protection class
—Ambient insensitive within the stated operating temperature range of -20° to +70°C
—Built-in thermal memory to prevent hot motor restarts
—Protection against complete phase current loss
—Manual reset (standard) and remote reset (optional) 24 VDC or 120 VAC
—Accuracy: ± 2%
—Repeatability: ± 2%
—Self-powered @ 50% of minimum current range
—Size: 1-6 (0.40A-540A, 600V, 50/60 Hz)
—Unbalance trip signal for PLC operation
—Manual trip
—Visual trip indication
—Standard isolated 1 NO and 1 NC aux. contact (A600, Q600)
—Built-in line/load straps
—Fits with existing 300-Line Starters
—Power factor correction terminals (sizes 1-4)
—DIN rail mountable sizes 1 & 2

**Publications and Reference:** See Section 17 for a complete list of additional product-related publications

# NEMA Rated Full Voltage Starters - Magnetic

## CR306, CR386 Magnetic Starters

**Nonreversing, Non-combination**
**NEMA Sizes 00-9 with Thermal Overload Relay**
**600 Volts Maximum 50/60 Hertz**

### Application

GE's magnetic motor starters listed here may be used for starting full-voltage, nonreversing, single-speed ac motors up to 1600 horsepower, 600 Volts maximum, providing protection to the motor against running or stalled overloads.

Their compact size and ease of wiring make them especially suitable for motor control centers, custom-type control panels, and switchgear equipment. Refer to page 1-9 for features of basic starter.

### Product Number Selection Instructions

**1.** Specify starter by complete Product Number.
Example: CR306C103 is a Size 1 starter with 230-240-Volt, 60-Hertz coil and in Type 1 general-purpose enclosure @ **$246.00, GO-10G**.

**2.** The final letter of the Product Number denotes extra auxiliary contacts (sometimes referred to as auxiliary interlocks). Order the desired extra auxiliary contacts by replacing the final letter with one from first column of auxiliary interlock table (see page 1-136).
Example: CR306C103AAB is Size 1 starter with one extra normally open, auxiliary contact @ **$312.00, GO-10G**.

**3.** Starter forms are available with coils of other ratings than those shown on pages 1-11 to 1-12. Refer to coil suffix table, page 1-8 for information. To order forms with other coil ratings, insert suffix from coil table in place of fifth and sixth **numbers** of listed starter Product Number shown on pages 1-11 to 1-12. (Contact your nearest GE Consumer & Industrial Representative for other available starter coils not shown in table.)
Example: A CR306C1**02** NEMA Size 1, three-pole starter in Type 1 enclosure with 24-Volt, 60-Hertz coil becomes a CR306C1**24** Product Number.

**4.** For continuous rated motors with a service factor of 1.15 to 1.25 select the heater with maximum motor Amperes equal to or immediately greater than the actual full-load current taken directly from the nameplate of motor. Order heaters by complete Product Number from appropriate heater tables on pages 1-155 to 1-161. **List Price $9.00 each, GO-10H**. Packaged in quantities of three; must be ordered in multiples of three.

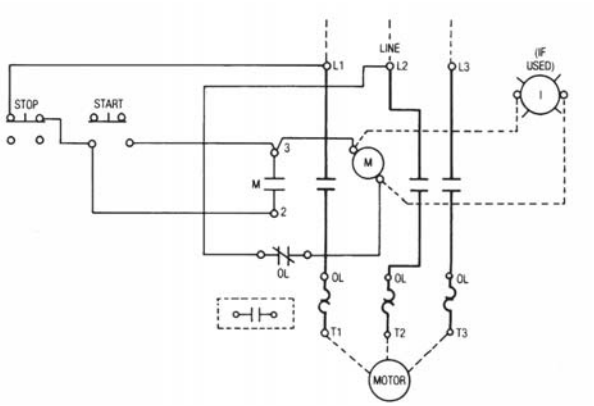
**5.** Order special modifications or forms not listed by complete description using a listed Product Number as reference.
Example: Similar to CR306C104 except with 480/120-Volt control transformer and red indicating light in cover.
Total **List Price . . . . . $483.00, GO-10G**.

**6.** Two-phase, four-wire forms are available. Contact nearest GE Consumer & Industrial Representative for pricing and ordering information.

**7. Standard Coil Ratings**
Standard Voltages (60 Hertz): 24, 115-120, 200-208, 230-240, 265-277, 460-480 and 575-600
Standard Voltages (50 Hertz): 110, 220, 380, 440 and 550
For price adders on special voltage and/or frequency coils, refer to page 1-128.

**8. 50-Hertz Starters**
Pricing of starters for use on 50 Hertz at standard voltages is the same as shown in table for 60 Hertz. Refer to page 1-6 for three-phase horsepower ratings at 380 Volts, 50 Hertz.

Typical CR306 Size 4 magnetic motor starter




Typical Schematic Diagram for CR306 Starter (NEMA Sizes 00-6)

**9. Product Notes**
Motor full-load current should not exceed continuous ampere rating of starter.

**10.** NEMA Types 4/4X and 12: UL listed to include Class II Group F and G, Div. 2 only, and Class III Hazardous Location. External reset not included on standard listed forms (NEMA Type 12).

### Reference Publications

**Instructions**

| NEMA Size | Publication Number |
|---|---|
| 00, 0, 1 | GEH-5190 |
| 2 | GEH-4774 |
| 3 | GEH-4806 |
| 4 | GEH-4807 |
| 5 | GEH-4839 |
| 6 | GEH-5198 |
| 7-9 | GEH-5108 |

### CR306, CR386 Magnetic Starters – Contents



**Other Coil Voltages:** See page 1-8
**Factory Installed Modifications:** See pages 1-126 to 1-133
**Field Installed Modifications:** See pages 1-134 to 1-140
**Extra Auxiliary Contacts:** See pages 1-134 to 1-136
**Heater Selection Tables:** See pages 1-155 to 1-161

# NEMA Full Voltage Power Devices
## NEMA Rated Full Voltage Starters - Magnetic
## CR306, CR386 Magnetic Starters

**Nonreversing, Non-combination, Open, NEMA Type 1, 3R, 12, 4/4X**
**NEMA Sizes 00-9 with Thermal Overload Relay**
**600 Volts Maximum 50/60 Hertz**
**GE Fastrac Program items are printed in red type.**

**Three-Phase**

List Price includes a holding interlock, pressure terminals for the line and load connections, plus a 3-leg block type overload relay (manual reset). External reset not included in standard listed enclosed forms. One NO isolated contact on the overload relay is available as an option at **$24.00, GO-10G**. To order add suffix LAA to Product Numbers (Size 00-5) listed in table.
Three heaters should be ordered as separate items. See pages 1-155 to 1-161 for selection. **List price $9.00 each, GO-10H.**

### CR306, Three-Phase Magnetic Starters

| NEMA Size | Continuous Ampere Rating[1] | Voltage | Horsepower | Open Type Product Number CR306 | Open Type List Price GO-10G | NEMA Type 1 Product Number CR306 | NEMA Type 1 List Price GO-10G | NEMA Type 3R Product Number CR306 | NEMA Type 3R List Price GO-10G | NEMA Type 12[3] Product Number CR306 | NEMA Type 12[3] List Price GO-10G | NEMA Type 4/4X[3] Product Number CR306 | NEMA Type 4/4X[3] List Price GO-10G |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 00 | 9 | Separate Control—115-120 V | | A002 | **$162.00** | A102 | **$174.00** | Use NEMA Size 0 | | Use NEMA Size 0 | | Use NEMA Size 0 | |
| 00 | 9 | 200-208 | 1 1/2 | A023 | **$162.00** | A123 | **$174.00** | Use NEMA Size 0 | | Use NEMA Size 0 | | Use NEMA Size 0 | |
| 00 | 9 | 230-240 | 1 1/2 | A003 | **$162.00** | A103 | **$174.00** | Use NEMA Size 0 | | Use NEMA Size 0 | | Use NEMA Size 0 | |
| 00 | 9 | 460-480 | 2 | A004 | **$162.00** | A104 | **$174.00** | Use NEMA Size 0 | | Use NEMA Size 0 | | Use NEMA Size 0 | |
| 00 | 9 | 575-600 | 2 | A005 | **$162.00** | A105 | **$174.00** | Use NEMA Size 0 | | Use NEMA Size 0 | | Use NEMA Size 0 | |
| 0 | 18 | Separate Control—115-120 V | | B002 | **$204.00** | B102 | **$216.00** | B602 | **$288.00** | B202 | **$288.00** | B402 | **$426.00** |
| 0 | 18 | 200-208 | 3 | B023 | **$204.00** | B123 | **$216.00** | B623 | **$288.00** | B223 | **$288.00** | B423 | **$426.00** |
| 0 | 18 | 230-240 | 3 | B003 | **$204.00** | B103 | **$216.00** | B603 | **$288.00** | B203 | **$288.00** | B403 | **$426.00** |
| 0 | 18 | 460-480 | 5 | B004 | **$204.00** | B104 | **$216.00** | B604 | **$288.00** | B204 | **$288.00** | B404 | **$426.00** |
| 0 | 18 | 575-600 | 5 | B005 | **$204.00** | B105 | **$216.00** | B605 | **$288.00** | B205 | **$288.00** | B405 | **$426.00** |
| 1 | 27 | Separate Control—115-120 V | | C002 | **$234.00** | C102 | **$246.00** | C602 | **$318.00** | C202 | **$318.00** | C402 | **$462.00** |
| 1 | 27 | 200-208 | 7 1/2 | C023 | **$234.00** | C123 | **$246.00** | C623 | **$318.00** | C223 | **$318.00** | C423 | **$462.00** |
| 1 | 27 | 230-240 | 7 1/2 | C003 | **$234.00** | C103[2] | **$246.00** | C603 | **$318.00** | C203 | **$318.00** | C403 | **$462.00** |
| 1 | 27 | 460-480 | 10 | C004 | **$234.00** | C104 | **$246.00** | C604 | **$318.00** | C204 | **$318.00** | C404 | **$462.00** |
| 1 | 27 | 575-600 | 10 | C005 | **$234.00** | C105 | **$246.00** | C605 | **$318.00** | C205 | **$318.00** | C405 | **$462.00** |
| 2 | 45 | Separate Control—115-120 V | | D002 | **$426.00** | D102 | **$486.00** | D602 | **$618.00** | D202 | **$618.00** | D402 | **$918.00** |
| 2 | 45 | 200-208 | 10 | D023 | **$426.00** | D123 | **$486.00** | D623 | **$618.00** | D223 | **$618.00** | D423 | **$918.00** |
| 2 | 45 | 230-240 | 15 | D003 | **$426.00** | D103 | **$486.00** | D603 | **$618.00** | D203 | **$618.00** | D403 | **$918.00** |
| 2 | 45 | 460-480 | 25 | D004 | **$426.00** | D104 | **$486.00** | D604 | **$618.00** | D204 | **$618.00** | D404 | **$918.00** |
| 2 | 45 | 575-600 | 25 | D005 | **$426.00** | D105 | **$486.00** | D605 | **$618.00** | D205 | **$618.00** | D405 | **$918.00** |
| 3 | 90 | Separate Control—115-120 V | | E002 | **$690.00** | E102 | **$810.00** | E602 | **$966.00** | E202 | **$966.00** | E402 | **$1422.00** |
| 3 | 90 | 200-208 | 25 | E023 | **$690.00** | E123 | **$810.00** | E623 | **$966.00** | E223 | **$966.00** | E423 | **$1422.00** |
| 3 | 90 | 230-240 | 30 | E003 | **$690.00** | E103 | **$810.00** | E603 | **$966.00** | E203 | **$966.00** | E403 | **$1422.00** |
| 3 | 90 | 460-480 | 50 | E004 | **$690.00** | E104 | **$810.00** | E604 | **$966.00** | E204 | **$966.00** | E404 | **$1422.00** |
| 3 | 90 | 575-600 | 50 | E005 | **$690.00** | E105 | **$810.00** | E605 | **$966.00** | E205 | **$966.00** | E405 | **$1422.00** |
| 4 | 135 | Separate Control—115-120 V | | F002 | **$1578.00** | F102 | **$1830.00** | F602 | **$2346.00** | F202 | **$2346.00** | F402 | **$2874.00** |
| 4 | 135 | 200-208 | 40 | F023 | **$1578.00** | F123 | **$1830.00** | F623 | **$2346.00** | F223 | **$2346.00** | F423 | **$2874.00** |
| 4 | 135 | 230-240 | 50 | F003 | **$1578.00** | F103 | **$1830.00** | F603 | **$2346.00** | F203 | **$2346.00** | F403 | **$2874.00** |
| 4 | 135 | 460-480 | 100 | F004 | **$1578.00** | F104 | **$1830.00** | F604 | **$2346.00** | F204 | **$2346.00** | F404 | **$2874.00** |
| 4 | 135 | 575-600 | 100 | F005 | **$1578.00** | F105 | **$1830.00** | F605 | **$2346.00** | F205 | **$2346.00** | F405 | **$2874.00** |
| 5 | 270 | Separate Control—115-120 V | | G002 | **$3855.00** | G102 | **$4317.00** | G602 | **$5637.00** | G202 | **$5637.00** | G402 | **$5637.00** |
| 5 | 270 | 200-208 | 75 | G023 | **$3855.00** | G123 | **$4317.00** | G623 | **$5637.00** | G223 | **$5637.00** | G423 | **$5637.00** |
| 5 | 270 | 230-240 | 100 | G003 | **$3855.00** | G103 | **$4317.00** | G603 | **$5637.00** | G203 | **$5637.00** | G403 | **$5637.00** |
| 5 | 270 | 460-480 | 200 | G004 | **$3855.00** | G104 | **$4317.00** | G604 | **$5637.00** | G204 | **$5637.00** | G404 | **$5637.00** |
| 5 | 270 | 575-600 | 200 | G005 | **$3855.00** | G105 | **$4317.00** | G605 | **$5637.00** | G205 | **$5637.00** | G405 | **$5637.00** |
| 6 | 540 | Separate Control—115-120 V | | HH002 | **$9165.00** | HH102 | **$12165.00** | HH602 | **$13785.00** | HH202 | **$13785.00** | HH402 | **$15165.00** |
| 6 | 540 | 200-208 | 150 | HH023 | **$9165.00** | HH123 | **$12165.00** | HH623 | **$13785.00** | HH223 | **$13785.00** | HH423 | **$15165.00** |
| 6 | 540 | 230-240 | 200 | HH003 | **$9165.00** | HH103 | **$12165.00** | HH603 | **$13785.00** | HH203 | **$13785.00** | HH403 | **$15165.00** |
| 6 | 540 | 460-480 | 400 | HH004 | **$9165.00** | HH104 | **$12165.00** | HH604 | **$13785.00** | HH204 | **$13785.00** | HH404 | **$15165.00** |
| 6 | 540 | 575-600 | 400 | HH005 | **$9165.00** | HH105 | **$12165.00** | HH605 | **$13785.00** | HH205 | **$13785.00** | HH405 | **$15165.00** |

### CR386 Three-Phase Magnetic Starters

| NEMA Size | Continuous Ampere Rating[1] | Voltage | Horsepower | Control Circuit Voltage | Open Type Product Number CR386 | Open Type List Price GO-10G |
|---|---|---|---|---|---|---|
| 7 | 810 | Separate Control —115-120 V | | | J002AA1A | **$13167.00** |
| 7 | 810 | 220-240 | 300 | 230 | J003AA1A | **$13167.00** |
| 7 | 810 | 440-480 | 600 | 460 | J004AA1A | **$13167.00** |
| 7 | 810 | 550-600 | 600 | 575 | J005AA1A | **$13167.00** |
| 8 | 1215 | Separate Control —115-120 V | | | K002AA1A | **$19455.00** |
| 8 | 1215 | 220-240 | 450 | 230 | K003AA1A | **$19455.00** |
| 8 | 1215 | 440-480 | 900 | 460 | K004AA1A | **$19455.00** |
| 8 | 1215 | 550-600 | 900 | 575 | K005AA1A | **$19455.00** |
| 9 | 2250 | Separate Control —115-120 V | | | L002AA1A | **$31983.00** |
| 9 | 2250 | 220-240 | 800 | 230 | L003AA1A | **$31983.00** |
| 9 | 2250 | 440-480 | 1600 | 460 | L004AA1A | **$31983.00** |
| 9 | 2250 | 550-600 | 1600 | 575 | L005AA1A | **$31983.00** |

[1]Motor full load current should not exceed continuous ampere rating of the starter.
[2]Units are individually boxed and "Poly-Packed" six per carton as standard.
[3]NEMA Type 4/4X and 12 starters are UL listed in include Class 11, Groups F and G, Division 2 only and Class III hazardous locations.

**Publications and Reference:** See Section 17 for a complete list of additional product-related publications
**Enclosure Descriptions:** See Section 13