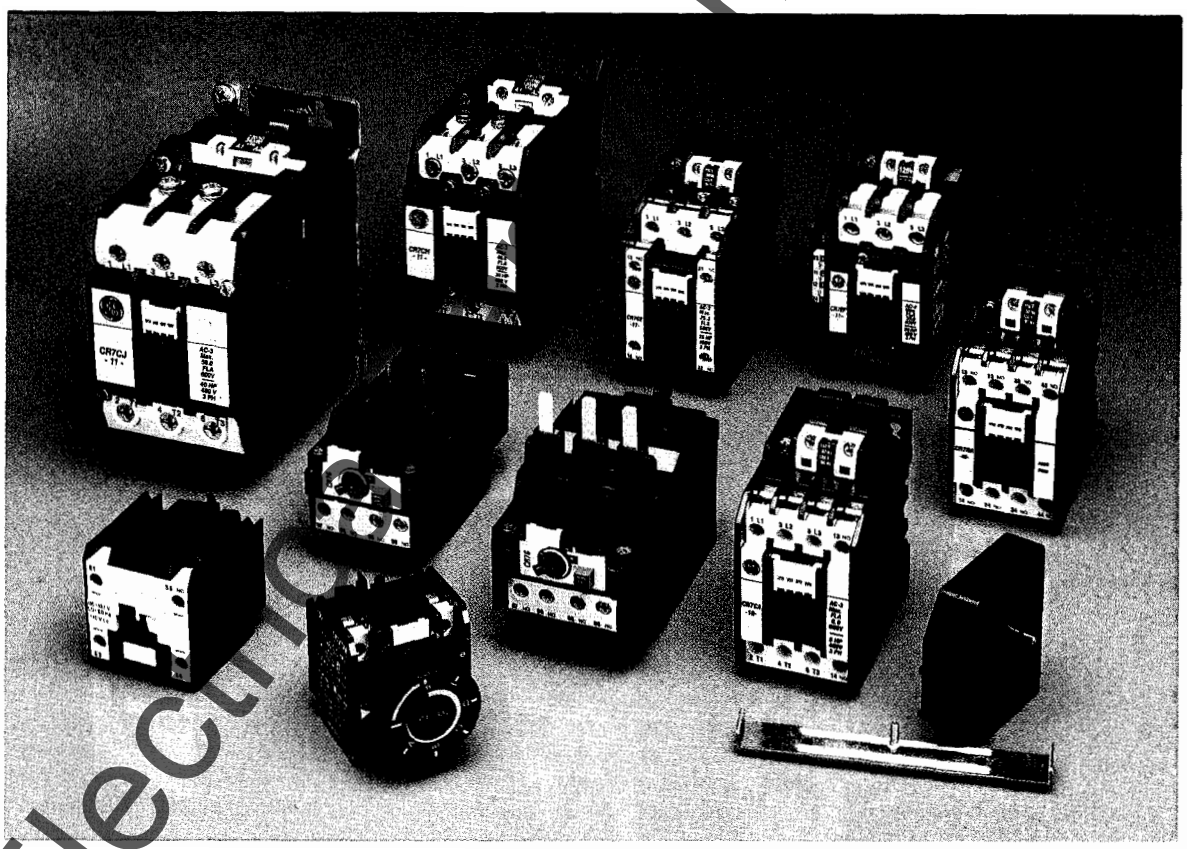
Spectra 700™ Control



- Compact, Durable, Space Saving Contactors, Starters, Overload Relays, Control Relays, and Full Line of Accessories

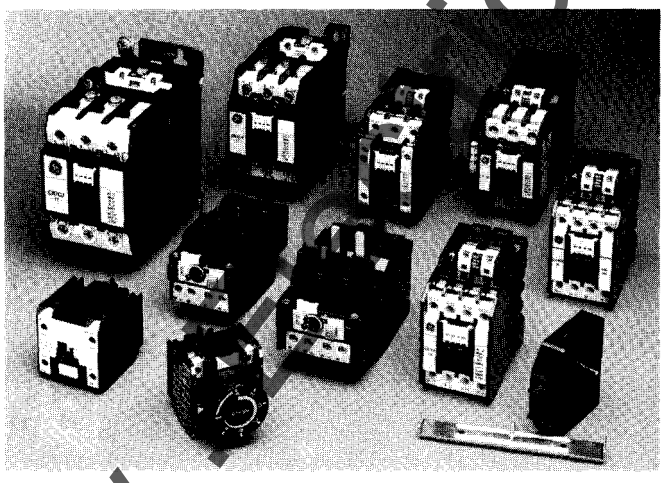
Table of Contents

Contactors, Overload Relays, Control Relays, Accessories

GE's new Spectra 700™ Control consists of contactors, overload relays, starters, control relays and accessories. It is designed to meet both the U.S. and European industrial market needs. These compact devices show outstanding performance while offering convenient installation and wiring plus flexibility through smaller size and modular construction.

The internationally accepted contactor system is available in nine rating steps from 5 horsepower to 50 horsepower at 460 Volts, 3-phase, 60 Hertz.

DC operated contactor forms are available through 20 horsepower at 460 Volts.



There are two overload relay options: Class 10 fixed heater overload with either auto/manual reset or with manual reset only; and the Class 20 interchangeable heater overload which utilizes replaceable heaters that can also be installed in 300-Line overload relays.

Two types of fixed heater overload relays are available for contactor frame sizes CR7CA through CC, CE, CF and CR7ZA through ZC, ZE, ZF:

- The CR7G1W* fixed heater overload provides field conversion from manual to automatic reset for maximum flexibility.
- The CR7G1T* fixed heater form is supplied with manual reset only for greater safety.

The CR7G4T* fixed heater overload with manual reset is available for contactor sizes CR7CG and CH, and the CR7G5T* unit is supplied for contactor sizes CR7CJ and CK.

All interchangeable heater overloads for frames CR7CA through CC and CE through CK are furnished with manual reset only function.

With both Class 10 fixed heater, and Class 20 interchangeable heater overload relays available, optimum selection for many applications is provided.

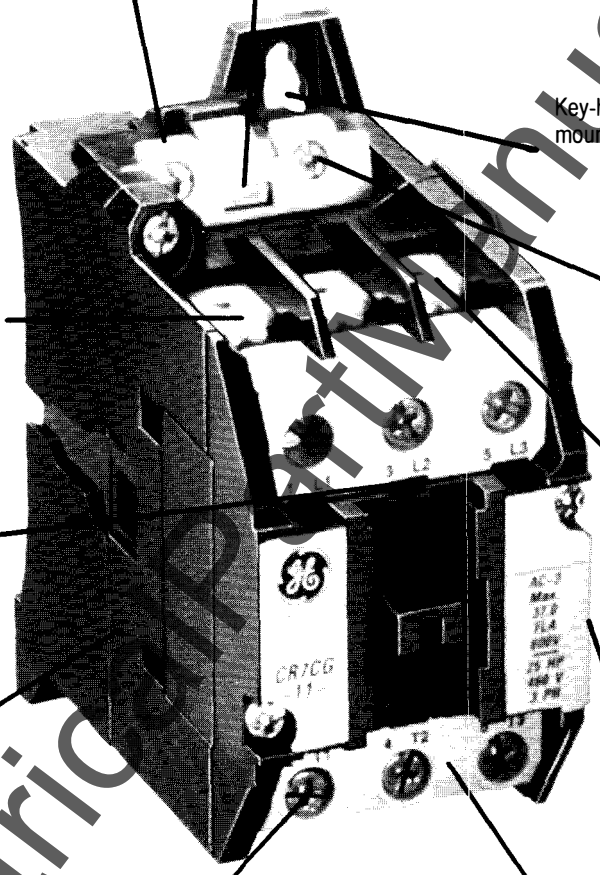
Also available is a line of ac and dc operated control relays which are rated at 600 Volts, 10 Amperes. A broad line of accessories is common to all contactor sizes and relay forms.

Spectra 700™ Control benefits the customer not only by way of product cost, but also through the reduction in required panel space. In addition, there will be less wiring and installation costs.

Spectra 700™ Control products are applied through the use of application rating curves, thereby sizing the control to meet the specific application category.

Contactors

Durable, compact modular (5-50 hp @ 460V).
Both AC and DC operated available.



Top-wired coil for easy wiring and installation.

One-step coil withdrawal above 20hp for easy changeout and maintenance. Common coil through 20hp for fewer stocking parts.

Key-hole mounting slot makes panel mounting a breeze.

Encapsulated coil for environmental protection and long life (standard frames G-K, optional frames A-F).

Self-lifting terminals shipped in open position for easy wiring.

Tapped holes suitable for ring terminals allow greater flexibility and easy installation. Also meets demanding automotive specifications.

Inspectable, changeable contacts above 20hp for easy serviceability and extended operating life.

Compact, rugged design engineered for extended mechanical life.

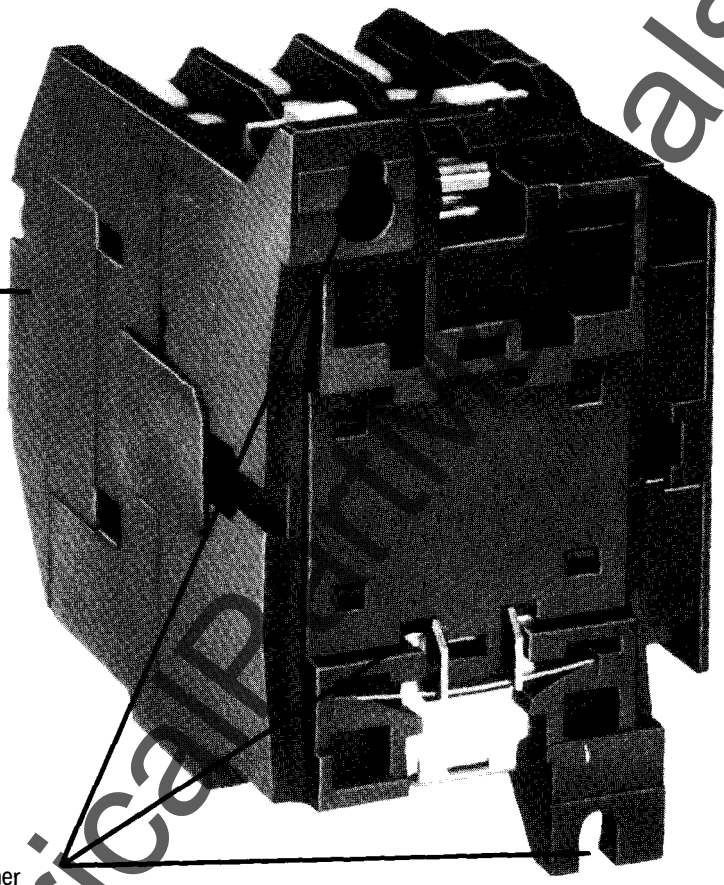
All frame sizes designed for either 35mm DIN rail or panel mount for easy installation.

Guards for finger and back of hand protection prevent accidental contact with current-carrying parts.

All terminals use standard straight-blade or Phillips type screwdriver for added convenience; no special tools required.

Contactors

Durable, compact, modular (5-50hp @ 460V).
Both AC and DC operated available.

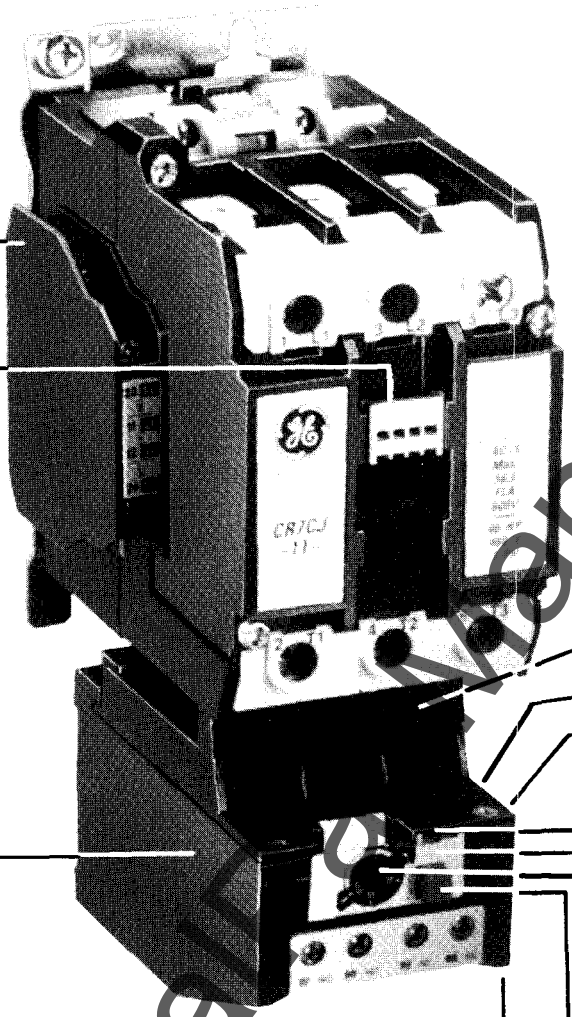


Compact, rugged design engineered for extended mechanical life.

All frame sizes designed for either 35mm DIN rail or panel mount for easy installation.

Starters

Available with fixed heater and interchangeable heater overload relays (5-50hp @ 460V).



Side and top mount accessories provide broad configuration flexibility.

Fixed Heater Overload

Fully guarded bus bars for added safety; no special parts required.

Differential single-phase protection.

Ambient compensated.

Switch auto/manual.

Visible trip indication on all overloads.

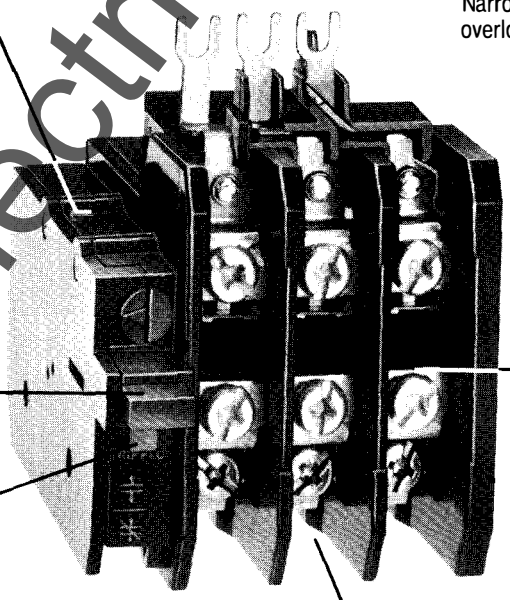
Manual trip test.

Adjustable current range. Optional transparent cover available to prevent unwanted adjustments.

Trip reset on upstroke (automotive specification).

Narrow width, Class 10 fixed heater overload relay saves valuable panel space.

Easy access trip test improves serviceability.



Traditional Class 20 interchangeable heater overload relay

Replaceable heaters offer greater versatility.

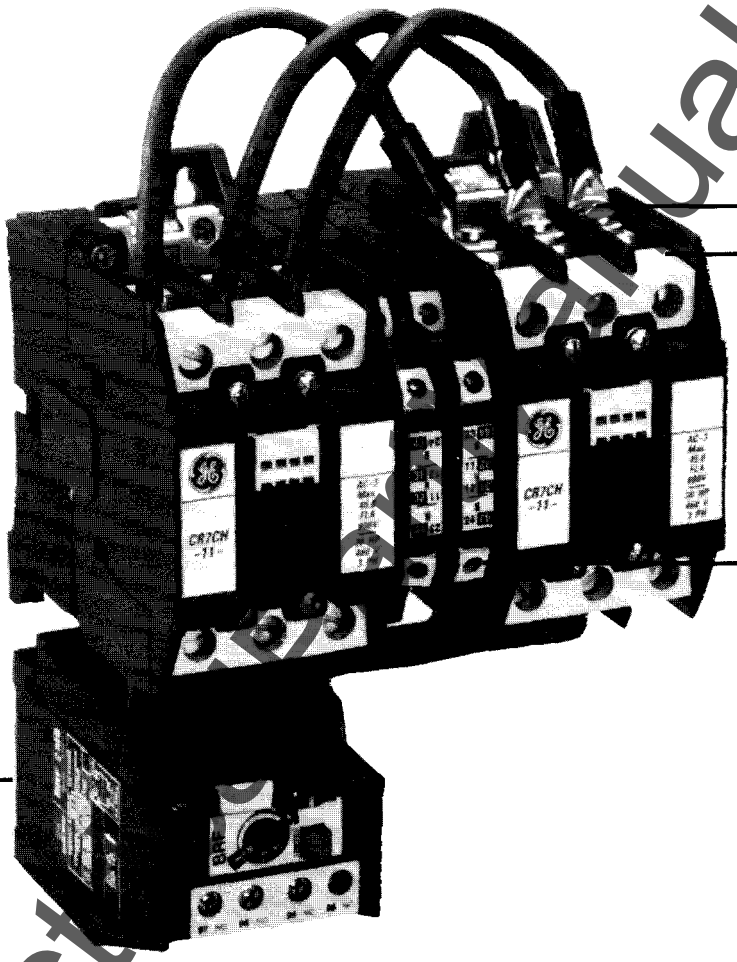
Manual reset on upstroke.

Visible trip indicator.

Heaters selectable for varied motor protection requirements and lower inventory costs.

Reversing Starters

Rugged, reliable, easy to wire (5-50 HP @ 460V).
Both AC and DC operated available.



Tapped holes for ring terminals for easy wiring

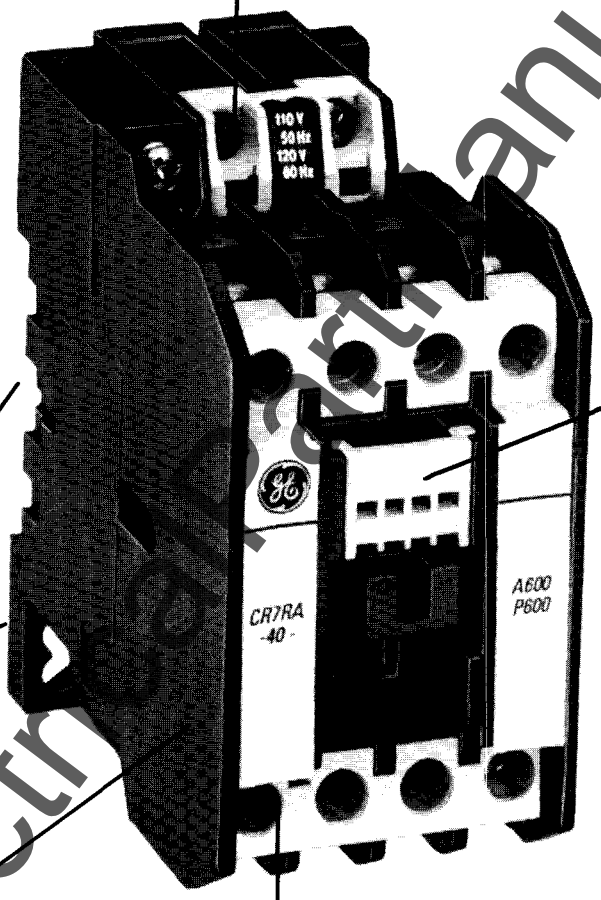
Customer power wiring unobstructed by reversing connections for added convenience and less confusion.

Integrated mechanical and cross-electrical interlock for one-step reversing with fewer parts in frame size G-K, 25-50hp @ 460V.

Fixed heater overload.

Control Relays

Available in 2 NO-2 NC, 3 NO-1 NC, 4 NO, AC or DC operated.



Top wired coil for easy access.

Marking tab for easy indentification.

Din rail or panel mount.

Rugged construction insures long life.

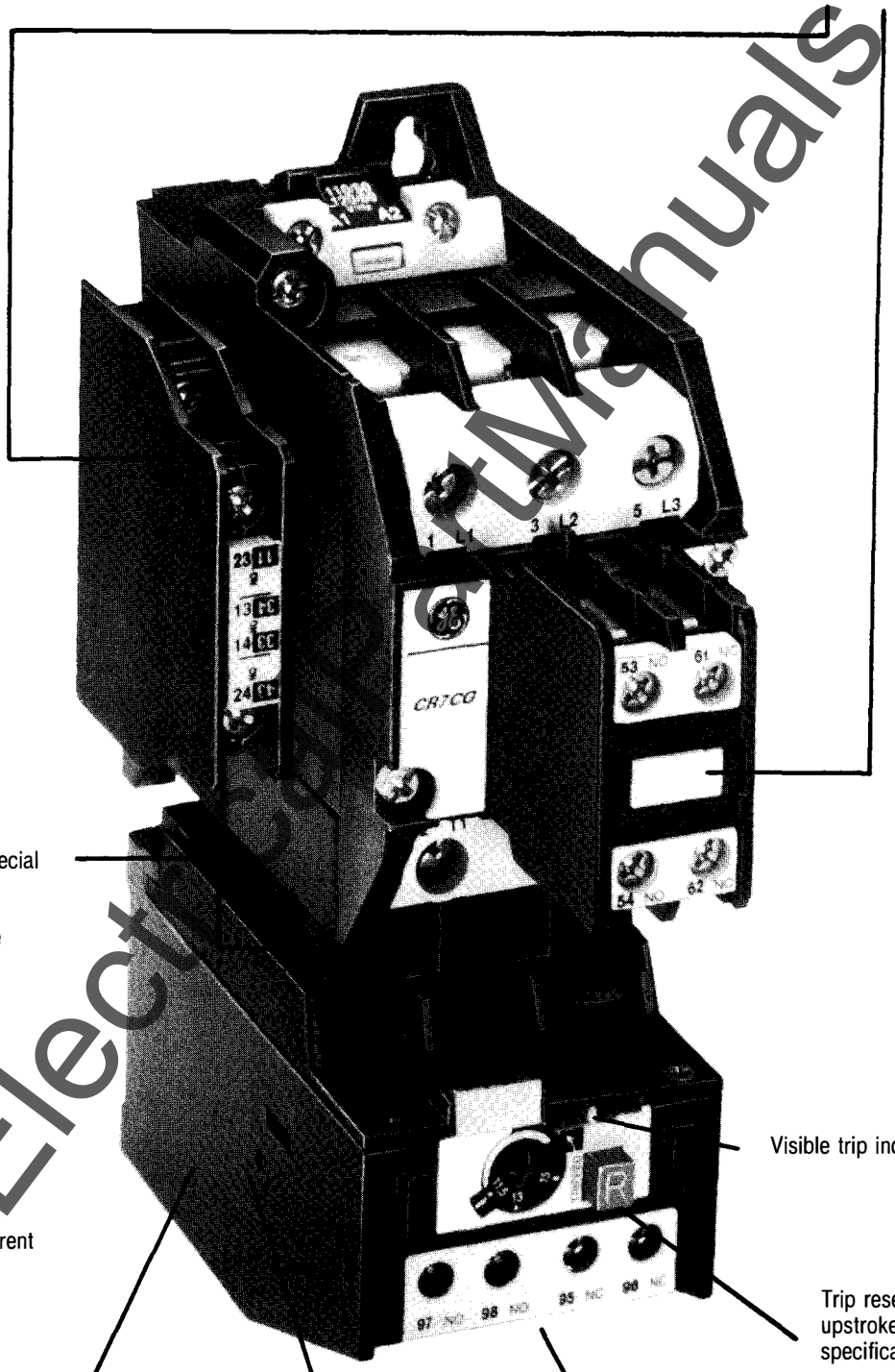
Terminals use standard straight blade or Phillips type screwdriver for added convenience; no special tools required.

- Top and side-mounted auxiliary contacts, plus timer and latch for easy installation.

Fixed Heater Overload

Starters

Side and top-mount accessories provide broad configuration flexibility.



- Fully guarded bus bars for added safety; no special parts required.
- Differential single-phase protection.
- Ambient compensated.
- Two overload options: auto/manual or manual reset only available on frames A-F, manual only frames G-K.
- Adjustable current range. Optional transparent cover available to prevent readjustments.

Visible trip indication.

Trip reset on upstroke (automotive specification).

Narrow width Class 10 overload relay saves valuable panel space.

Trip test for functional testing of overload trip mechanism.

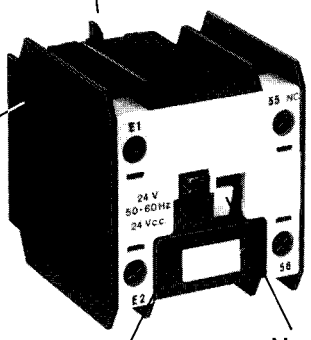
1 NO and 1 NC isolated contacts.

Accessories

A complete line of space-saving side mount, and snap on top mount accessories offers broad configuration flexibility.

Locking tab for quick installation and release.

Mechanical Latch
Top-mounted. Available in a wide range of release voltages for both AC and DC operations.



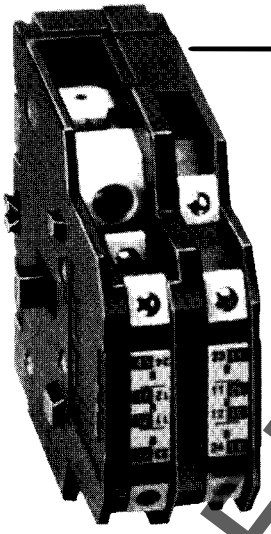
Manual release.

Manual test plus visible indication of contactor status.

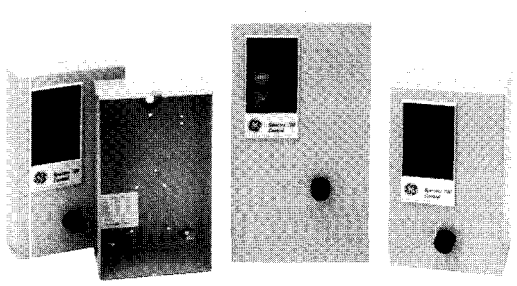
Compact size saves space.

Surge Suppressor
Suitable for both AC and DC coils.

Leads fit conveniently into coil terminals.

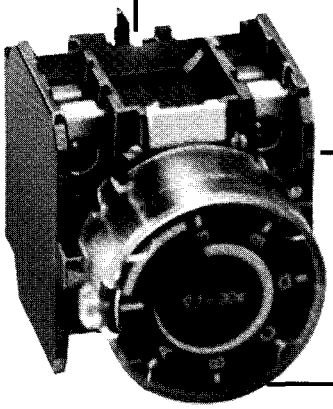


Adder Power Pole
With or without mechanical interlock and integral auxiliary contacts for added wiring convenience. Allows unique 5/3-pole, contactor configuration for multispeed 2 speed-1 winding motors.



Enclosures

Fits all frame sizes.



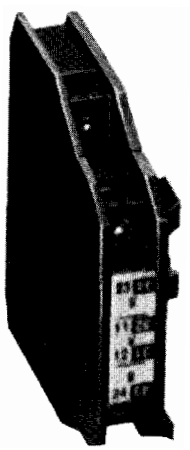
Pneumatic Timer
Timer selectable from time delay energization (TDE) to time delay de-energization (TDD).

Optional snap-on transparent sealing cap to prohibit unwanted changes of timer setting.

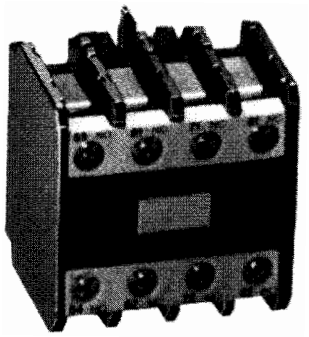
Also Available:
- Control power transformers
- Wide variety of enclosures . . . plus AC/DC operated control relays
- Mechanical interlocks

Accessories

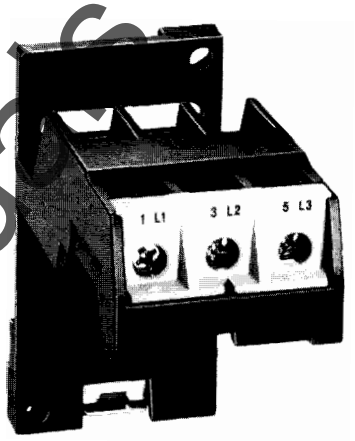
A complete line of space-saving side mount, and snap on top mount accessories offers broad configuration flexibility.



Side-Mounted Auxiliary
Offers configuration versatility without increasing height in shallow cabinets.



Contact Block – Top-mounted.
Easy to install. Four-pole and two-pole top adder blocks fit all frame sizes for fewer stocking parts.



Overload Base Adapter

Also available:

- **Control Amplifier** – one panel-mount form supplied for all contactor frame sizes and convenient to install; provides for low level signals to operate Spectra 700™ contactors while their control coils operate at the line voltage.
- **Control Transformer** – standard and extra capacity units available for low voltage control applications.
- **External Reset Kits** – available for panel mounting to reset starter overload relay in Type 1, 12 and 3R enclosure.
- **Panel-Mount/Base Adapter** – separate accessory kit for mounting all CR7G1W* and CR7G1T* overload relays through 32 Amperes; includes line terminals and a mounting base.
- **Panel-Mount Overload Relays** – complete line of relays available (25-72 amps) that offer separate line and load terminals for ease of wiring.
- **Pilot Device Kits** – full choice of selector switches, push buttons, and red indicating lights available for simplified field mounting by customer to an enclosed (Type 1) starter.
- **DIN Rail** – furnished in 35 millimeter widths and one meter lengths; provides snap-on, snap-off action where DIN-rail flexibility is desired; can be conveniently cut to a desired length.
- **Terminal Extender Kits** – provides wiring accessibility for the holding interlock on frames CR7CA through CC.
- **Marking Labels** – long lasting adhesive-back paper available in sheet form, used to handily identify contactor and/or auxiliary contacts.
- **Screw Kits** – furnished in packages of 30 metric ring terminal screws for field installation of power or control wiring.
- **Adapter Mounting Plate** – conveniently converts competitive mounting to new GE Spectra 700™ Control; permits flexibility for maintenance personnel to substitute new contactors/ relays.
- **Renewal Parts** – kits supplied to replace contacts (sizes CR7CG through CK) and coils (all contactor sizes and relay forms).
- **Reverser Bus Bars** – available for reverser sizes CR71VG through VK to provide ease of wiring for load side of contactor.
- **Enclosures** – can be furnished for all contactors and starters in NEMA Types 1, 3R, 4 and 12; painted in light gray.

Application Information and Technical Data

Introduction

The GE Spectra 700™ Control line of contactors, overload relays, control relays and accessories was designed to meet both the United States and European industrial market needs.

The contactors are devised to handle the switching of motor loads when specific application requirements are known. These requirements include: horsepower, full-load ampere rating of the motor being controlled, the electrical life desired (in millions of operations), the predetermined duty cycle, and the corresponding utilization category affected.

Utilization categories, which relate to the life/load characteristics curves, are illustrated for Spectra 700™ Control on pages 20-21. These curves enable judgement to be made on expected electrical life of the controller and may also be used to help derate Spectra 700™ contactors and starters where even longer anticipated electrical operating life is desired.

Spectra 700™ Control can also be adapted for switching loads such as transformers and capacitors.

Technical Data Summary – AC Operated Forms

Description	Contactor CR7–								
	CA	CB	CC	CE	CF	CG	CH	CJ	CK
Horsepower @ 460 Volts (AC-3)	5	7½	10	15	20	25	30	40	50
Continuous Ampere Rating Enclosed Open	25 25	25 25	25 25	35 40	45 45	45 54	45 54	75 80	75 80
Interlock/Auxiliary Contacts (A600, P600)	1NO	1NO	1NO	1NO-1NC	1NO-1NC	1NO-1NC	1NO-1NC	1NO-1NC	1NO-1NC
AC-1 Duty-General Use (Amperes)	25	25	25	35	45	45	45	75	75
AC-2/AC-3 Duty-Starting, Stopping and Standard Applications Max. Full-Load Amperes	9	12.5	17.5	25.3	30	37	45	56	73
Max. Horsepower Single-Phase 115 Volts 230 Volts	⅓ 1	½ 2	1 3	2 3	2 5	3 5	3 7.5	5 10	5 15
Three-Phase 200 Volts 208 Volts 230 Volts 460 Volts 575 Volts	2 2 2 5 7½	3 3 3 7½ 10	5 5 5 10 15	7½ 7½ 7½ 15 20	7½ 7½ 10 20 25	10 10 10 25 30	10 10 15 30 40	15 15 20 40 50	20 20 25 50 60
AC-4 Duty – Inching, Plugging, and Reversing Applications Max. Full-Load Amperes	4.5	6.6	9	12	18	19	23	30	37
Max. Horsepower 200 Volts 208 Volts 230 Volts 460 Volts 575 Volts	½ ¾ ¾ 1½ 1½	1½ 1½ 1½ 3 3	2 2 2 5 5	3 3 3 7½ 7½	5 5 5 10 10	5 5 5 10 10	5 5 7½ 15 15	5 5 7½ 15 15	7½ 7½ 10 20 20
Coil Burden (VA) Inrush Holding	55 9	55 9	55 9	55 9	55 9	85 15	85 15	170 25	170 25
Coil Pick-up Voltage (% of Coil Volts)	≤85	≤85	≤85	≤85	≤85	≤85	≤85	≤85	≤85
Coil Drop-out Voltage (% of Coil Volts)	50	50	50	50	50	40	40	45	45
Switching Delay at Rated Volts (Milliseconds) On Off	12-20 8-12	12-20 8-12	12-20 8-12	12-20 8-12	12-20 8-12	16-25 10-15	16-25 10-15	16-25 15-20	16-25 15-20
Mechanical Life (Millions of Operations)	20	20	20	20	20	15	15	15	15
Max. Oper. Current (Amperes) as a Function of Switchings per Hour at 480 Volts Max. Switchings per Hr.									
AC-3 600	9	12	16	22	30	37	45	63	75
AC-3 1200	9	12	12	14	20	26	32	45	52
AC-4 600	4.5	6.6	9	11	12	17	22	30	32
AC-4 1200	4.5	4.5	5	8	9	10	14	14	15
Weight (Less Carton) Contactor Overload Relay	15 oz. 7 oz.	15 oz. 7 oz.	15 oz. 7 oz.	1 lb./2 oz. 7 oz.	1 lb./3 oz. 7 oz.	1 lb./14 oz. 13 oz.	1 lb./14 oz. 13 oz.	3 lb./12 oz. 14 oz.	3 lb./12 oz. 14 oz.
Wire Size – Power Terminals 75°C (CU) AWG Torque (Main) lb. in.	16-10 10-15	16-10 10-15	16-10 10-15	14-8 14-20	14-8 14-20	10-4 25-45	10-4 25-45	10-3 25-50	10-3 25-50
Noise (dbA)	25	25	25	25	25	35	35	45	45

Field Installed Accessories . . . Pages 16-18
Dimensions and Weights . . . . . Pages 30-43

Technical Data Summary - DC Operated Forms

Description	Contactor CR7– –*				
	ZA	ZB	ZC	ZE	ZF
Horsepower @ 460 Volts (AC-3)	5	7½	10	15	20
Continuous Ampere Rating					
Enclosed	25	25	25	35	45
Open	25	25	25	40	45
Interlock/Auxiliary Contacts (A600, P600)	1NO	1NO	1NO	1NO-1NC	1NO-1NC
AC-1 Duty-General Use (Amperes)	25	25	25	35	45
AC-2/AC-3 Duty – Starting, Stopping and Standard Applications					
Max. Full-Load Amperes	9	12.5	17.5	25.3	30
Max. Horsepower					
Single-Phase					
115 Volts	⅓	½	1	2	2
230 Volts	1	2	3	3	5
Three-Phase					
200 Volts	2	3	5	7½	7½
208 Volts	2	3	5	7½	7½
230 Volts	2	3	5	7½	10
460 Volts	5	7½	10	15	20
575 Volts	7½	10	15	20	25
AC-4 Duty – Inching, Plugging, and Reversing Applications					
Max. Full-Load Amperes	4.5	6.6	9	12	18
Max. Horsepower					
200 Volts	½	1½	2	3	5
208 Volts	¾	1½	2	3	5
230 Volts	¾	1½	2	3	5
460 Volts	1½	3	5	7½	10
575 Volts	1½	3	5	7½	10
Mechanical Life (Millions of Operations)	20	20	20	20	20
Coil Burden (Watts)					
Inrush	8.5	8.5	8.5	8.5	8.5
Holding	8.5	8.5	8.5	8.5	8.5
Coil Pick-up Voltage (% of Coil Volts)	≤ 80	≤ 80	≤ 80	≤ 80	≤ 80
Coil Drop-out Voltage (% of Coil Volts)	20	20	20	20	20
Switching Delay at Rated Volts (Milliseconds)					
On	50	50	50	50	50
Off	10	10	10	10	10
Max. Oper. Current (Amperes) as a Function of Switchings per Hour at 460 Volts					
Max. Switchings per Hr.					
AC-3 600	9	12	16	22	30
AC-3 1200	9	12	12	14	20
AC-4 600	4.5	6.6	9	11	12
AC-4 1200	4.5	4.5	5	8	9
Weight (Less Carton) Contactor	1 lb./10 oz	1 lb./10 oz.	1 lb./10 oz.	1 lb./13 oz.	1 lb./14 oz.
Wire Size - Power Terminals					
75°C (CU) AWG	16-10	16-10	16-10	14-8	14-8
Torque (Main) lb. in.	10-15	10-15	10-15	14-20	14-20
Noise (dbA)	25	25	25	25	25

Application Information and Technical Data

Control Circuit Contact Ratings

Ratings and Test Values for AC Control Circuit Contacts at either 50 or 60 Hertz.

Contact Rating Designation	Thermal Continuous Test Current Amperes	Maximum Current, Amperes									
		120 Volts		240 Volts		480 Volts		600 Volts		Voltamperes	
		Make	Break	Make	Break	Make	Break	Make	Break	Make	Break
A600	10.0	60	6.0	30	3.00	15	1.50	12	1.2	7200	720
B600	5.0	30	3.0	15	1.50	7.5	0.75	6	0 6	3600	360
C600	2.5	15	1 5	7 5	0.75	3.75	0.375	3	0.3	1800	180

Ratings and Test Values for DC Control Circuit Contacts

Contact Rating Designation	Thermal Continuous Test Current Amperes	Maximum Make or Break Current, Amperes			Make or Break at 300 Volts or Less, Voltamperes
		125 Volts	250 Volts	301 to 600 Volts	
P300	5.0	1.1	0 55	—	138
P600	5.0	1.1	0.55	0.20	138
Q600	2.5	0.55	0.27	0.10	69
R300	1.0	0.22	0.11	—	28

Note:

For rating at 300 Volts or less, the make and break ratings shall be obtained by dividing the voltampere rating by the application voltage but shall not exceed the continuous carrying current.

The dc rating shown in the above table shall not be exceeded when applied to control circuit devices.

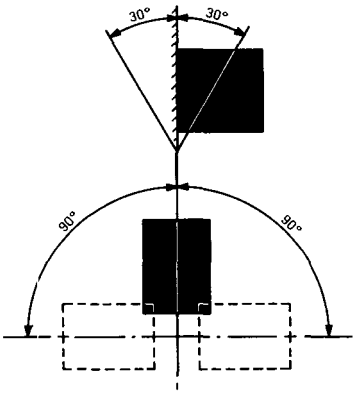
Caution Note:

Most circumstances require that the contacts of control circuit devices be applied at values less than their make and break ratings. Refer to NEMA Standard ICS 2 for information relating to specific control circuits.

Mounting Position

The electrical apparatus must be installed on a vertical plane. The contactor(s) will continue to maintain proper operation when plane is tilted up to 30 degrees from the vertical.

The contactor(s) also operate correctly when rotated through 90 degrees from the vertical.



Standards

The Spectra 700™ contactors meet the following international standards:

- Compliance with Standards
  - –IEC International 947.4, 158-1
  - –CEI Italy 17.3
  - –VDE Germany 0660/1
  - –BS Great Britain 5424.1
  - –UTE France 63-110
- Approvals, Listings, Certifications
  - –UL USA 508
  - –CSA Canada C22.2 No 14
  - –ASE Switzerland
- Marine Approvals
  - –R.I. Na Italy (Approved)
  - –LROS Great Britain (Pending)
  - –Polski Rejestr Statkow Poland (Pending)

Environmental Operating Conditions

Operating temperature: −20°C to +55°C (−4°F to +131°F)
Storage temperature: −30°C to +80°C (−22°F to +176°F)

Field Installed Accessories ... Pages 16-18
Dimensions and Weights .....Pages 30-43

Electrical Life

Utilization Categories

Utilization categories are used to describe the type of motor load and duty cycle. Each category has a unique life/load curve which is used to estimate expected electrical life of a specific controller.

Following are descriptions of the most common AC Utilization Categories:

- AC-1 – noninductive or slightly inductive loads, such as resistance furnaces.
- AC-2 – starting of slip ring motors without plugging.
- AC-3 – starting and stopping of squirrel cage motors. This utilization category is typical of the standard type of motor duty encountered in most industrial applications.
- AC-4 – starting of squirrel cage motors in inching, plugging, and reversing applications, i.e., this means continuous plugging, reversing, and inching.
- AC-11 – control circuit contact characteristics.

Life curves . . . how to use

To determine estimated electrical life for a specific contactor, follow these guidelines:

1. Determine appropriate utilization category. The illustrations below show typical life curves for Spectra 700™ contactors which will operate in the AC-1 and AC-2 utilization categories. AC-3, AC-4, AC-3/AC-4 (mixed duty), and AC-11 life curves are shown on page 24.
2. Once the appropriate utilization category has been determined, then using the operating current applied to the appropriate curve, it is easy to determine the expected contactor's life by reading the figure (in millions of operations) to the left of the intersection of the rated operating current and the contactor curve.

Example: Using a motor duty cycle of starting and stopping (standard) for a three-phase squirrel cage motor rated 15 horsepower at 460 Volts with an operating current of 19.6 Amperes, choose utilization category curve AC-3 and take the following action:

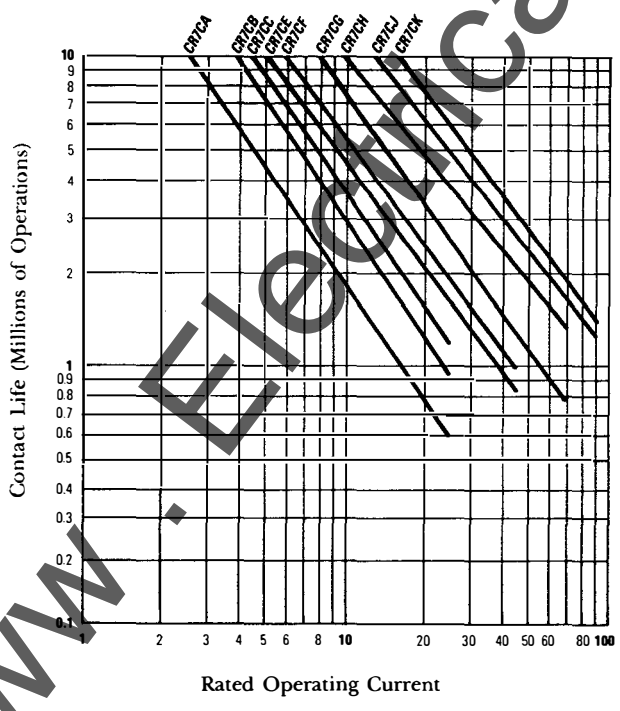
A. Locate rated operating current on bottom (horizontal) scale and draw a vertical line to intersect the first heavy line which will indicate contactor size. In this example, the drawn vertical line for 19.6 Amperes will intersect the CR7CE contactor line.

B. Reading the vertical scale to the left of the intersection point denotes an expected life of approximately 1.5 million operations for the selected size of contactor.

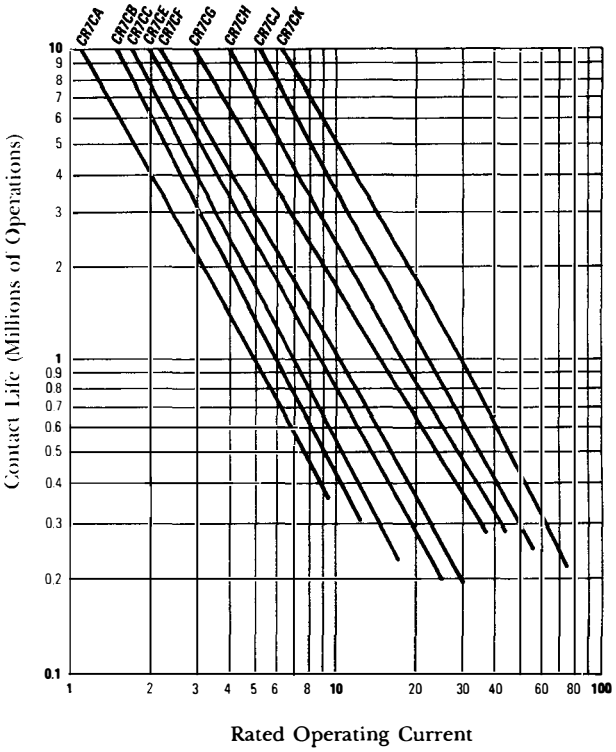
C. If greater contactor life is required, continue the drawn vertical line to intersect with a larger size contactor line.

Caution Note: Do not apply a contactor for use on a motor which has a greater horsepower rating than shown in the Data Summary table on page 20.

AC-1: Non-, or lightly inductive loads, e.g., resistance furnaces



AC-2: Starting of slip ring motors without plugging

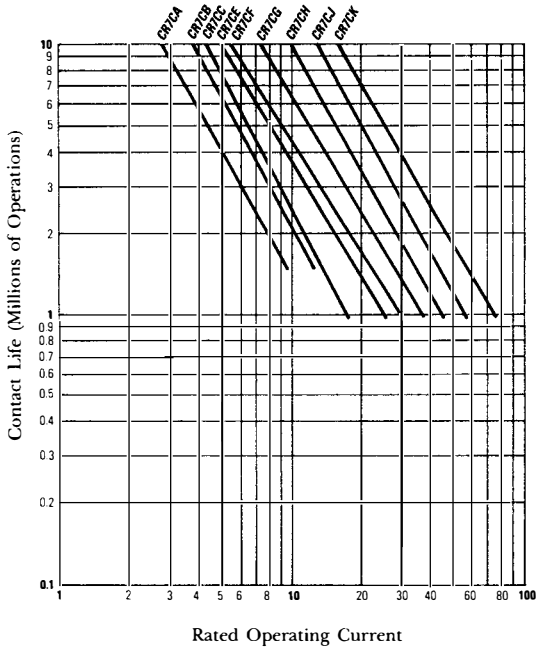


Application Information and Technical Data

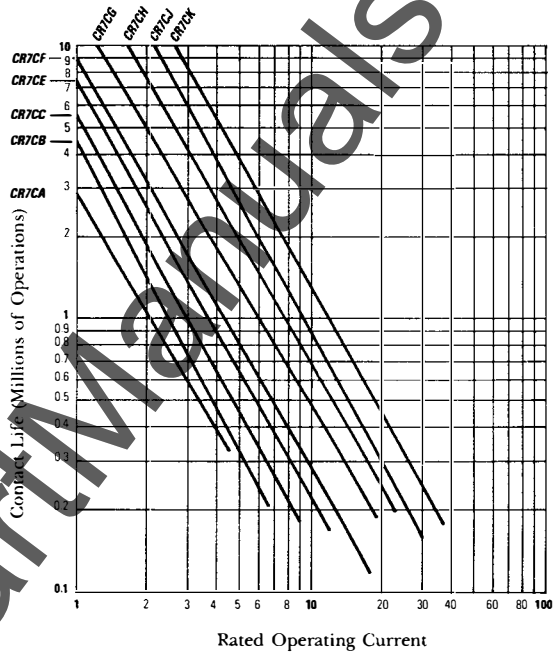
Electrical Life (Cont.)

Utilization Categories

AC-3: Interruption of running squirrel cage motors

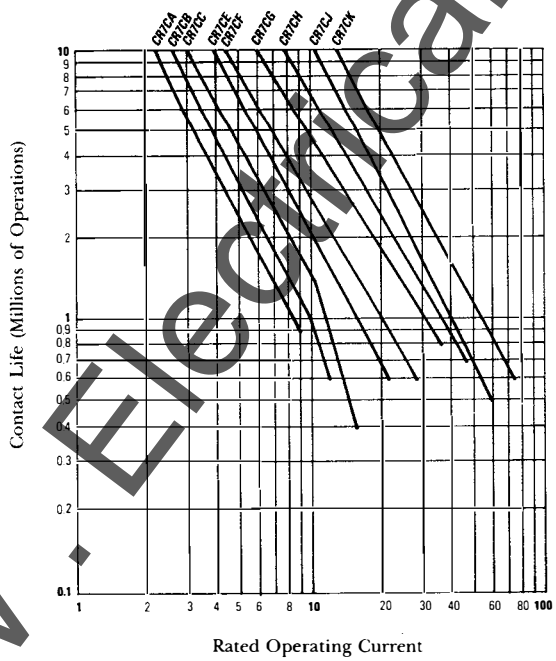


AC-4: Inching (jogging) of squirrel cage motors

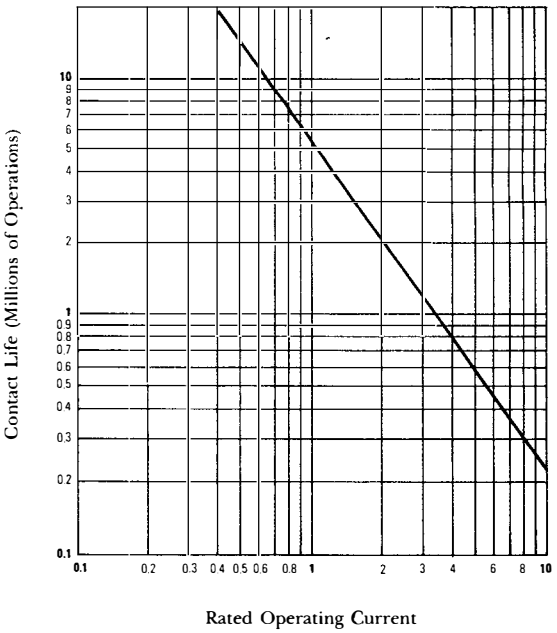


AC-3/AC-4: Mixed duty with squirrel cage motors

AC-3: 90% interruption of running squirrel cage motors
AC-4: 10% inching (jogging)



AC-11: Control circuit contact characteristics



Field Installed Accessories ... Pages 16-18
Dimensions and Weights ..... Pages 30-43

DC Utilization Categories

Spectra 700™ Control can be used as dc contactors in many industrial applications. These include: dc load banks, loop contactors and dynamic braking contactors in adjustable speed dc drives and other special motor control applications. Contact the motor manufacturer as to the starting requirements of a particular motor. Only small motors can be started at full voltage. Medium- and large-sized dc motors require resistance in series with armature during acceleration when connected to a constant potential dc system.

AC contactors are conditionally suitable for switching dc. The switching capacity for dc, using AC contactors, is also decreased as the voltage increases, and also as inductance is added to the circuit.

Utilization Categories have been assigned to the more popular loads where contactors are required. They include:

DC-1

DC-1 applications involve switching non inductive loads such as resistive load banks.

DC-2

DC-2 applications involve starting and switching off shunt wound dc motors. Shunt wound dc motors are those most frequently used in adjustable voltage, adjustable speed dc drives. Even dc motors with permanent magnet fields are usually considered to be shunt wound.

DC-3

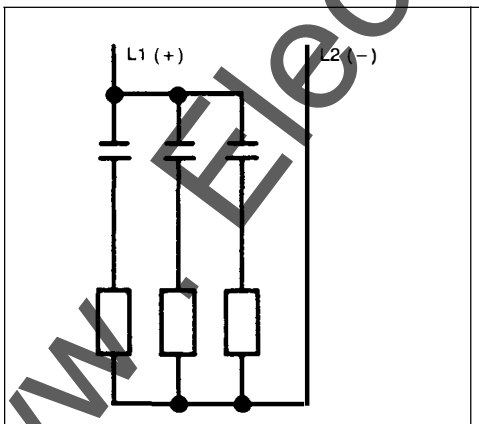
DC-3 applications involve starting, stopping, plugging and jogging shunt wound dc motors. Jogging is an inexpensive, and frequently ordered dc drive modification. Care must be taken to determine when jogging is required, since it is more a severe duty than covered by category DC-2.

DC-4 and DC-5

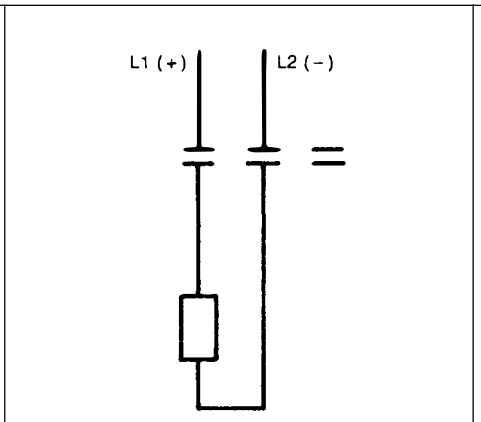
DC-4 and DC-5 applications cover use with series wound, traction-type dc motors. Traction motor requirements are application intensive and should involve factory review.

DC Contactor Life Categories at Full-load Current Levels

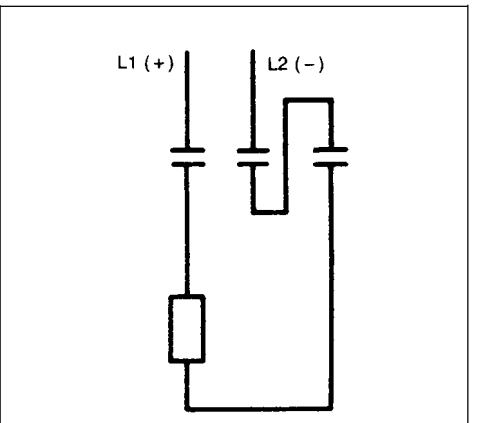
Catalog Number	Contactor Ampere Ratings													
	24 Volts DC		115 Volts DC						230 Volts DC					
	DC-1	DC-2 Thru DC-5	DC-1			DC-2	DC-3	DC-4	DC-5	DC-1			DC-2	DC-3, DC-4	DC-5
	Number of Poles in Series														
	1-3	3	1	2	3	3	3	3	3	1	2	3	3	3	3
CR7CA	9	9	3.5	8	9	9	4.5	5	2.0	0.55	3.5	6	5	1.8	0.8
CR7CB	12	12	4.3	11	12	12	5.5	6	2.5	0.65	4.3	8	6	2.2	1.0
CR7CC	16	16	5.2	15	16	16	6.5	7	3.0	0.8	5.0	10	7	2.5	1.2
CR7CE	23	23	7.0	18	23	23	17.0	17	4.5	1.0	5.0	13	12	6.0	2.0
CR7CF	30	30	8.0	22	30	30	22.0	22	6.0	1.2	5.0	16	14	9.0	2.5
CR7CG	37	37	10.0	28	37	37	27.0	27	8.0	1.6	6.0	20	17	12.0	3.5
CR7CH	45	45	12.0	35	45	45	32.0	32	10.0	2.0	6.0	25	20	14.0	4.0
CR7CJ	60	60	14.0	45	55	60	40.0	45	14.0	5.0	12.0	32	25	18.0	5.5
CR7CK	75	75	16.0	55	70	75	48.0	55	17.0	5.0	12.0	40	30	22.0	6.5



Single-pole operation



Two poles in series



Three poles in series

Application Information and Technical Data

Transformer and Capacitor Switching

GE Spectra 700™ Contactors can also be used for non-motor loads such as capacitor or transformer switching.

Maximum KVA of Transformer for Primary Switching

Form	Inrush = 15 x Normal					Inrush = 20 x Normal					Inrush = 30 x Normal				
	120V	208V	240V	480V	600V	120V	208V	240V	480V	600V	120V	208V	240V	480V	600V
CR7CA															
Single-phase															
Three-phase															
CR7CB															
Single-phase															
Three-phase															
CR7CC															
Single-phase															
Three-phase															
CR7CE															
Single-phase															
Three-phase															
CR7CF															
Single-phase															
Three-phase															
CR7CG															
Single-phase															
Three-phase															
CR7CH															
Single-phase															
Three-phase															
CR7CJ															
Single-phase															
Three-phase															
CR7CK															
Single-phase															
Three-phase															

Maximum KVAR of Capacitors

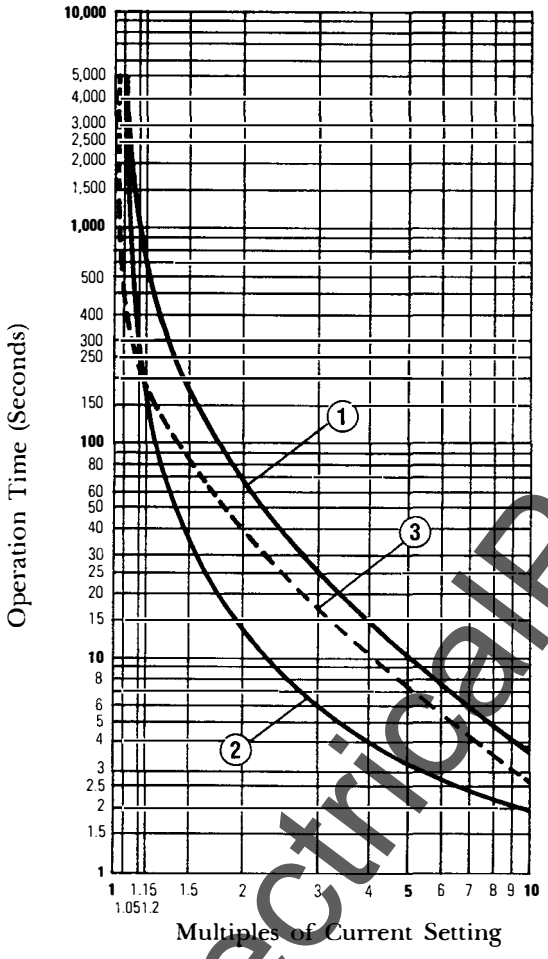
Catalog Number	Volts			
	200	230	460	575
CR7CA, CB, CC KVAR - Open Enclosed				
CR7CE, CF KVAR - Open Enclosed				
CR7CG, CH KVAR - Open Enclosed				
CR7CJ, CK KVAR - Open Enclosed				

Field Installed Accessories ... Pages 16-18
Dimensions and Weights ..... Pages 30-43

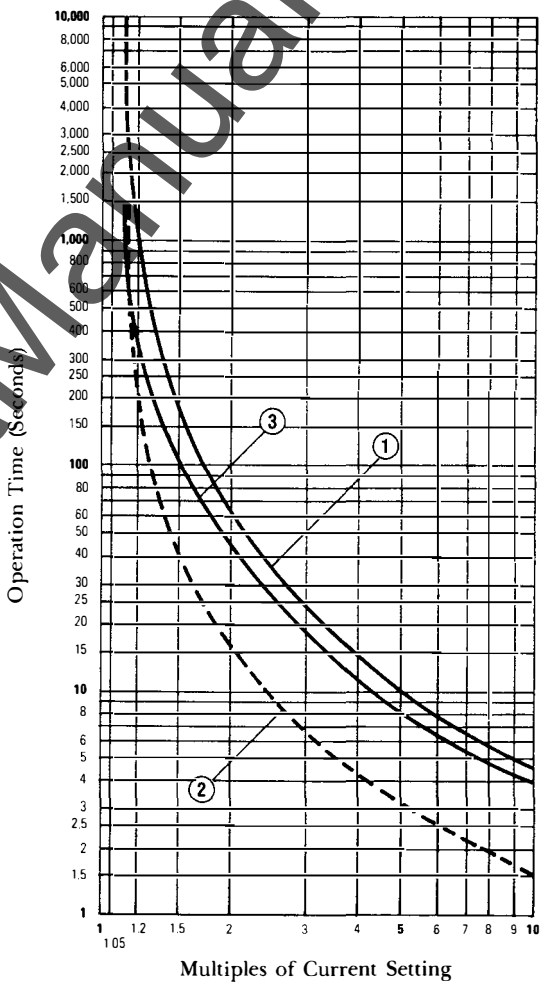
Fixed Heater Overload Relays

GE offers three styles of fixed heater overload relays to complement the Spectra 700™ Control Line. The following curves show the time/current relationship of all CR7G Series Overload Relays.

CR7G1T, CR7G1W



CR7G4T, CR7G5T, CR7G8T

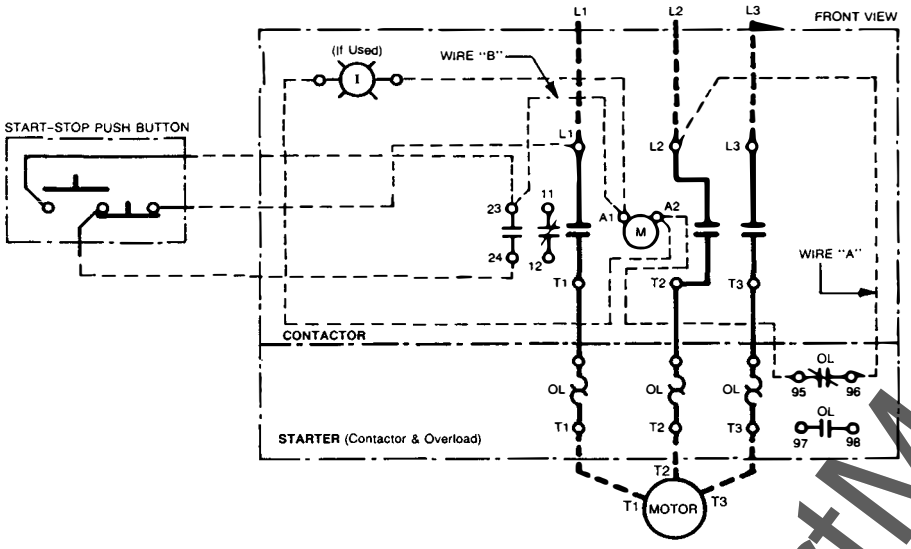


Legend for Both Fixed Heater Overload Curves

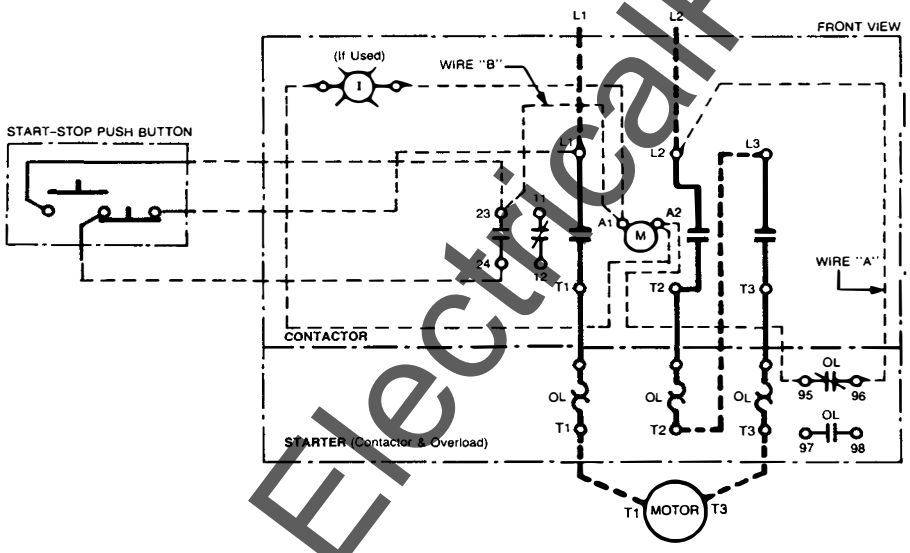
① Cold State Current
② Hot State Current
③ Single Phasing

Application Information and Technical Data

Typical Schematic Diagrams

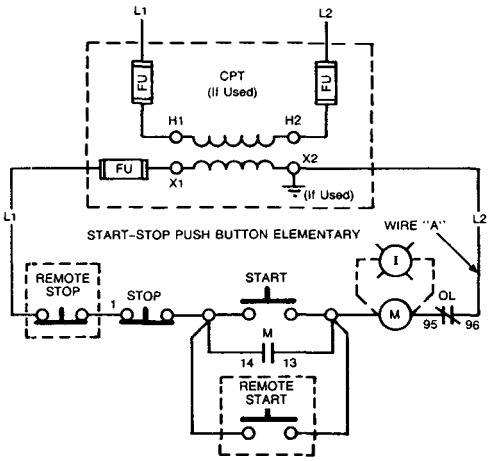


Typical schematic diagram for CR7C and CR7S three-phase ac motor starters/contactors showing start-stop pushbutton connections



Typical schematic diagram for CR7C and CR7S single-phase ac motor starters/contactors showing start-stop pushbutton connections

Notes: Holding interlock is numbered 13 and 14 on some forms and the normally closed auxiliary contact is not standard on all forms.
For connections to other pilot devices, see elementary and connection diagram numbers listed on page 29.



Start-stop pushbutton/control transformer elementary ①

① See NEC Article 450-3B for control transformer fusing requirements.

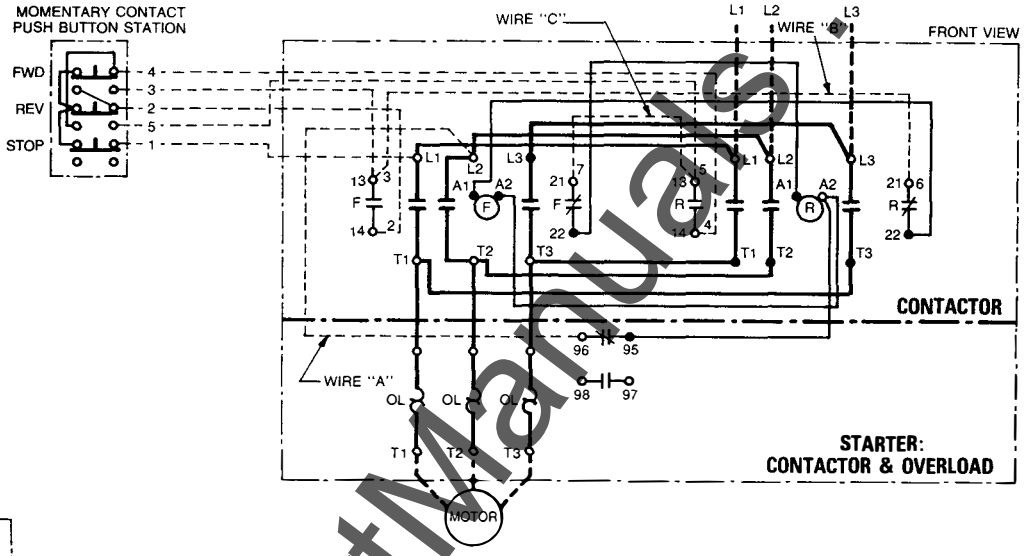
Reference:
Descriptive bulletin GEZ-7752

Field Installed Accessories ... Pages 16-18
Dimensions and Weights ..... Pages 30-43

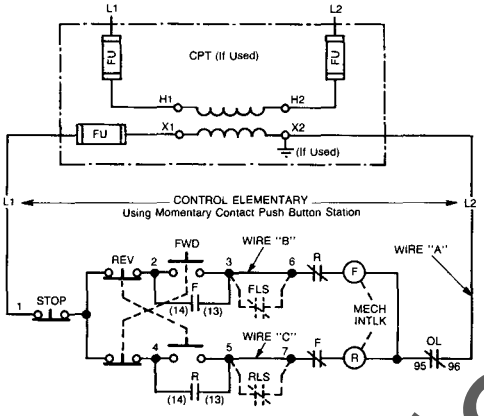
Schematic Diagrams (Cont.)

Legend

F and R – Forward and Reverse Line Contactors, Mechanically and Electrically Interlocked
FLS – Forward Limit Switch
RLS – Reverse Limit Switch
OL – Thermal Overload Relay



Typical schematic diagram for CR71V and CR7V three-phase AC reversing motor starters/contactors showing momentary contact pushbutton station connections



Momentary contact pushbutton station/ control transformer elementary

Notes: Holding and cross electrical interlocks are numbered 31 and 32 or 43 and 44 on some forms.

Wires "B" and "C" are omitted. These wires must be added if limit switches are not used.

- ● Factory wired terminals
- o Field wired terminals

For connections to other pilot devices, see elementary and connection diagram numbers listed below.

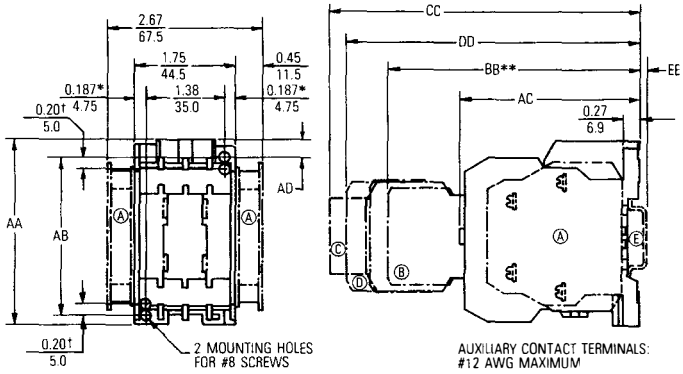
Three-Phase Elementary and Connection Diagram Numbers

Type of Device	Engineering Drawing Number			
	CR7CA, CB, CC	CR7CE	CR7CF	CR7CG, CH CR7CJ, CK
Non-Reversing Contactor/Starter	55-215082	55-215083	55-215084	55-215084
Reversing Contactor/Starter	55-536233	55-536234	55-536235	55-536236

Dimensions and Weights

CR7C Non-Reversing Contactors

Dual Dimensions Inches / Millimeters (For Estimating Only)—CR7C, Open AC Forms



Legend and Notes (for all illustrations on this page)

Ⓐ Extra Auxiliary Contacts, Side Mounted (if used). Left Side Auxiliary Contact is Standard for Frame Size CR7CF and is Used for Holding Interlock.

Ⓑ Extra Auxiliary Contacts, Front Mounted (if used).

Ⓒ Pneumatic Timer (if used).

Ⓓ Mechanical Latch (if used).

Ⓔ Provision for Steel Mounting Rail (35 mm).

* Add ½ inch for electrical clearance to enclosure.

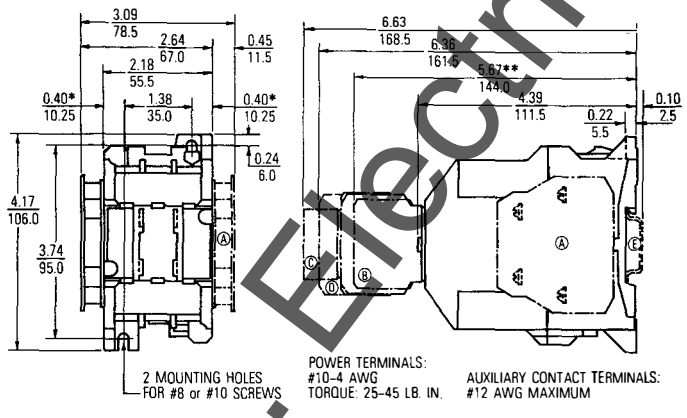
** Add ½ inch for electrical clearance to enclosure when using Ⓑ.

† Dimensions not applicable to CR7CE and CR7CF forms.

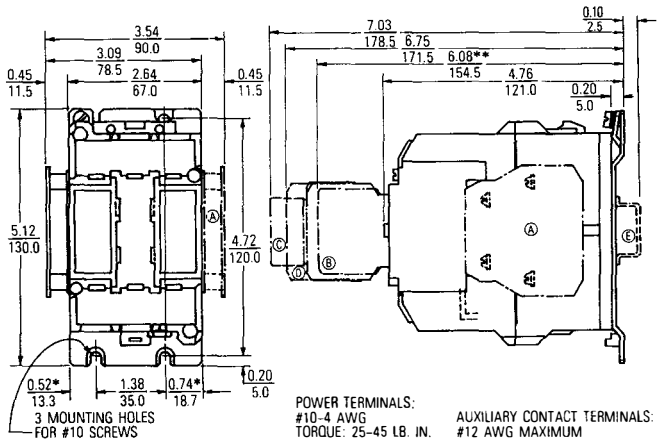
CR7CA, CB, CC, CE, and CF Open Type Contactors

Catalog Number	Approximate Dimensions											
	AA		AB		AC		AD		BB		CC	
	In.	mm	In.	mm	In.	mm	In.	mm	In.	mm	In.	mm
CR7CA, CB, CC	3.27	83.0	2.76	70.0	3.11	79.0	0.31	8.0	4.35	110.5	5.37	136.5
CR7CE	3.50	89.0	2.95	75.0	3.66	93.0	0.33	8.5	4.90	124.5	6.00	152.5
CR7CF	3.50	89.0	2.95	75.0	3.62	92.0	0.33	8.5	4.86	123.5	5.82	149.3

Catalog Number	Approximate Dimensions				Wire Size (Power Terminals)	Torque (Main) Lb. In.	Approximate Shipping Wt., Lb.	Engineering Drawing Number
	DD		EE					
	In.	mm	In.	mm				
CR7CA, CB, CC	5.10	129.5	0.08	2.0	# 16-10 AWG	10-15	1	55-215062
CR7CE	5.73	145.5	0.09	2.4	# 14-8 AWG	14-20	1¼	55-215063
CR7CF	5.61	142.5	0.09	2.4	# 14-8 AWG	14-20	1½	55-215064



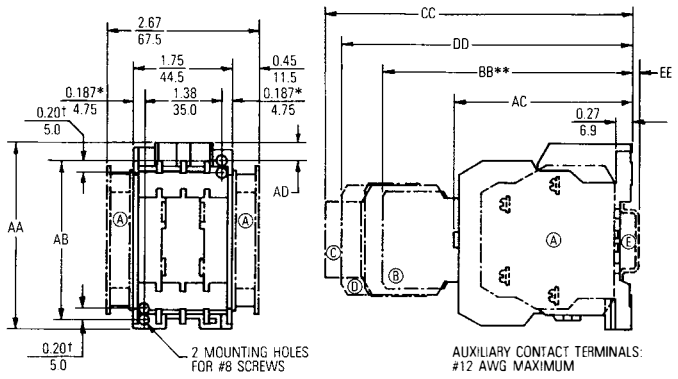
CR7CG, CH Open type contactors. Approximate shipping wt., 2 lb. Engineering Drawing Number 55-215065



CR7CJ, CK Open type contactors. Approximate shipping wt., 4 lb. Engineering Drawing Number 55-215066

Field Installed Accessories ..... Pages 16-18

Dual Dimensions $\frac{\text{Inches}}{\text{Millimeters}}$ (For Estimating Only)—CR7Z, Open DC Forms



Legend and Notes (for all illustrations on this page)

Ⓐ Extra Auxiliary Contacts, Side Mounted (if used). Left Side Auxiliary Contact is Standard for Frame Size CR7ZF and is Used for Holding Interlock.

Ⓑ Extra Auxiliary Contacts, Front Mounted (if used).

Ⓒ Pneumatic Timer (if used).

Ⓓ Mechanical Latch (if used).

Ⓔ Provision for Steel Mounting Rail (35 mm).

* Add ½ inch for electrical clearance to enclosure.

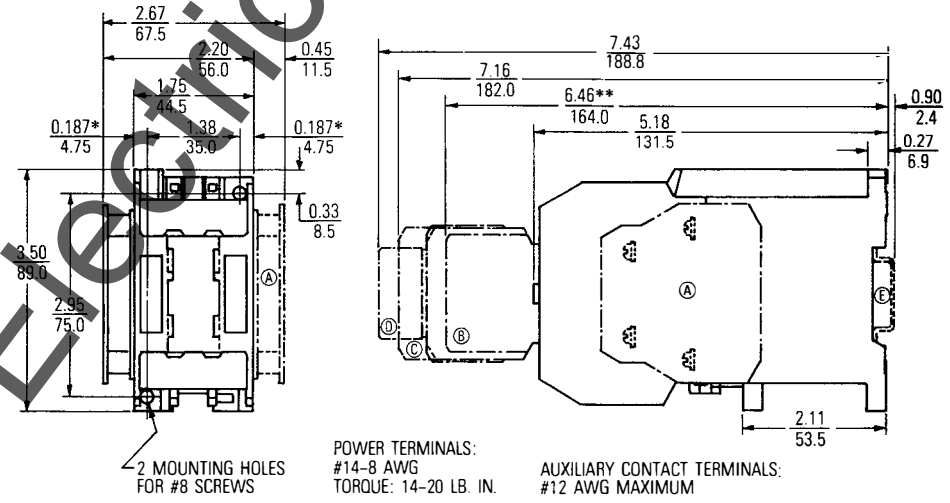
** Add ½ inch for electrical clearance to enclosure when using Ⓑ.

† Dimensions not applicable to CR7ZE forms.

CR7ZA, ZB, ZC, and ZE Open Type Contactors

Catalog Number	Approximate Dimensions											
	AA		AB		AC		AD		BB		CC	
	In.	mm	In.	mm	In.	mm	In.	mm	In.	mm	In.	mm
CR7ZA, ZB, ZC	3.27	83.0	2.76	70.0	4.66	118.5	0.31	8.0	5.90	150.0	6.93	176.0
CR7ZE	3.50	89.0	2.95	75.0	5.22	132.5	0.33	8.5	6.46	164.0	7.56	192.0

Catalog Number	Approximate Dimensions				Wire Size (Power Terminals)	Torque (Main) Lb. In.	Approximate Shipping Wt., Lb.	Engineering Drawing Number
	DD		EE					
	In.	mm	In.	mm				
CR7ZA, ZB, ZC	6.65	169.0	0.08	2.0	# 16-10 AWG	10-15	1¾	55-215085
CR7ZE	7.28	185.0	0.09	2.4	# 14-8 AWG	14-20	2	55-215086



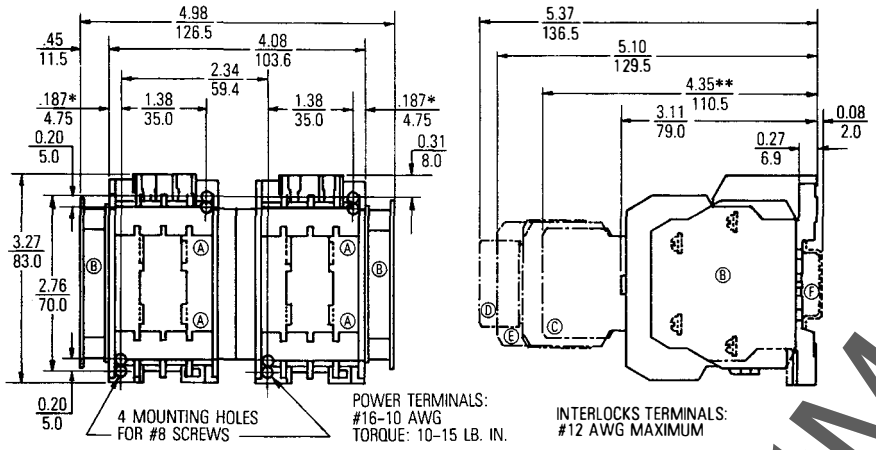
CR7ZF, Open type contactor. Approximate shipping wt., 2 lb.
Engineering Drawing Number 55-215087

Field Installed Accessories . . . . Pages 16-18

Dimensions and Weights

CR71V Reversing Contactors

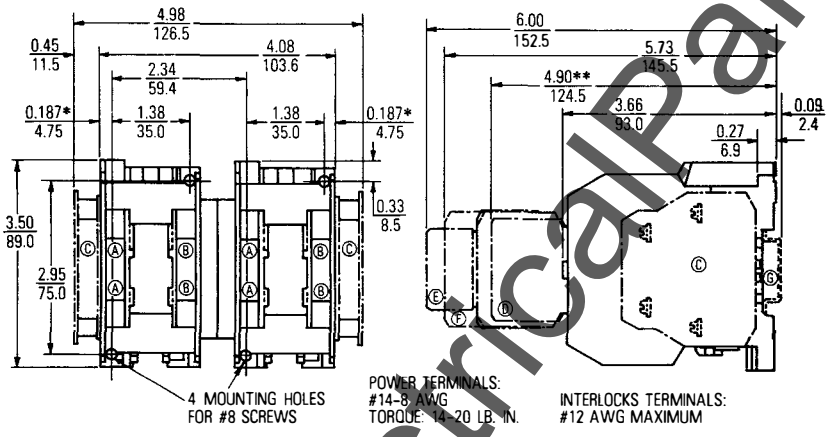
Dual Dimensions $\frac{\text{Inches}}{\text{Millimeters}}$ (For Estimating Only)—CR71V, Open AC Reversing Forms



CR71VA, VB, VC Open type ac reversing contactor. Approximate shipping wt., 2½ lb.
Engineering Drawing Number 55-215072

Legend and Notes for CR71VA, VB, VC Illustration

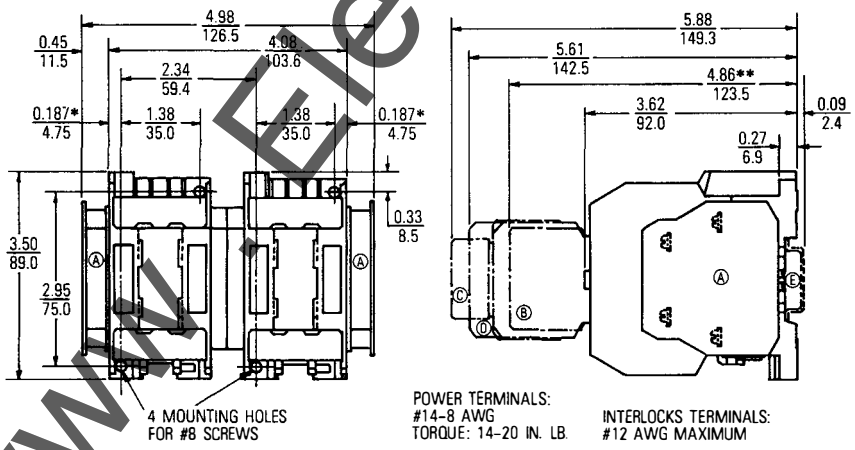
Ⓐ Standard Holding Interlock.
Ⓑ Cross Electrical Interlock (Plus Extra Auxiliary Contacts, if used).
Ⓒ Extra Auxiliary Contacts, Front Mounted (if used).
Ⓓ Pneumatic Timer (if used).
Ⓔ Mechanical Latch (if used).
Ⓕ Provision for Steel Mounting Rail (35 mm).
* Add ½ inch for electrical clearance to enclosure.
** Add ½ inch for electrical clearance to enclosure when using Ⓒ.



CR71VE Open type ac reversing contactor. Approximate shipping wt., 2¾ lb.
Engineering Drawing Number 55-215073

Legend and Notes for CR71VE Illustration

Ⓐ Standard Holding Interlock.
Ⓑ Cross Electrical Interlock.
Ⓒ Extra Auxiliary Contacts, Side Mounted (if used).
Ⓓ Extra Auxiliary Contacts, Front Mounted (if used).
Ⓔ Pneumatic Timer (if used).
Ⓕ Mechanical Latch (if used).
Ⓖ Provision for Steel Mounting Rail (35 mm).
** Add ½ inch for electrical clearance to enclosure.
** Add ½ inch for electrical clearance to enclosure when using Ⓓ.



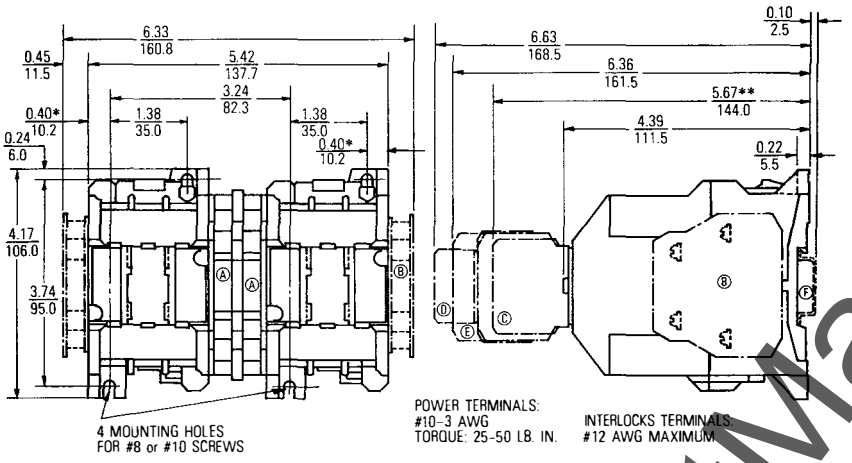
CR71VF Open type ac reversing contactor. Approximate shipping wt., 3 lb.
Engineering Drawing Number 55-215074

Legend and Notes for CR71VF Illustration

Ⓐ Standard Holding Interlocks and Cross Electrical Interlocks.
Ⓑ Extra Auxiliary Contacts, Front Mounted (if used).
Ⓒ Pneumatic Timer (if used).
Ⓓ Mechanical Latch (if used).
Ⓔ Provision for Steel Mounting Rail (35 mm).
* Add ½ inch for electrical clearance to enclosure.
** Add ½ inch for electrical clearance to enclosure when using Ⓑ.

References:
See page 30

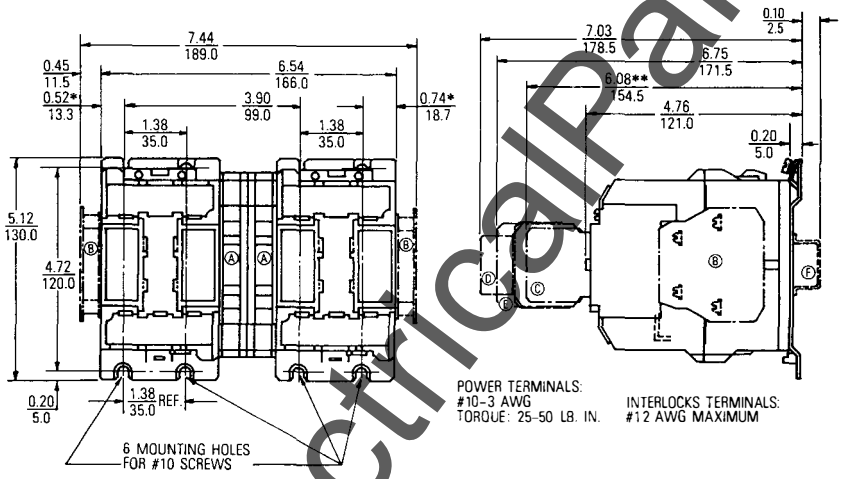
Dual Dimensions $\frac{\text{Inches}}{\text{Millimeters}}$ (For Estimating Only)—CR7IV, Open AC Reversing Forms



CR71VG, VH Open type ac reversing contactor. Approximate shipping wt., 4¼ lb.
Engineering Drawing Number 55-215075

Legend and Notes for CR71VG, VH Illustration

Ⓐ Standard Holding Interlocks and Cross Electrical Interlocks.
Ⓑ Extra Auxiliary Contacts, Side Mounted (if used).
Ⓒ Extra Auxiliary Contacts, Front Mounted (if used).
Ⓓ Pneumatic Timer (if used).
Ⓔ Mechanical Latch (if used).
Ⓕ Provision for Steel Mounting Rail (35 mm).
* Add ½ inch for electrical clearance to enclosure.
** Add ½ inch for electrical clearance to enclosure when using Ⓒ.



CR71VJ, VK Open type ac reversing contactor. Approximate shipping wt., 8 lb.
Engineering Drawing Number 55-215076

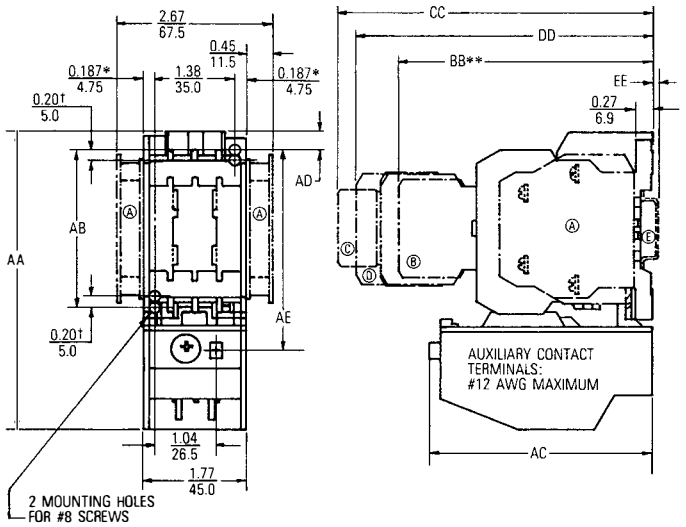
Legend and Notes for CR71VJ, VK Illustration

Ⓐ Standard Holding Interlocks and Cross Electrical Interlocks.
Ⓑ Extra Auxiliary Contacts, Side Mounted (if used).
Ⓒ Extra Auxiliary Contacts, Front Mounted (if used).
Ⓓ Pneumatic Timer (if used).
Ⓔ Mechanical Latch (if used).
Ⓕ Provision for Steel Mounting Rail (35 mm).
** Add ½ inch for electrical clearance to enclosure.
** Add ½ inch for electrical clearance to enclosure when using Ⓒ.

Dimensions and Weights

CR7S Non-Reversing Starters

Dual Dimensions Inches / Millimeters (For Estimating Only)—CR7S, Open AC Forms



Legend and Notes (for all illustrations on this page)

Ⓐ Extra Auxiliary Contacts, Side Mounted (if used). Left Side Auxiliary Contact is Standard for Frame Size CR7SF and is Used for Holding Interlock.

Ⓑ Extra Auxiliary Contacts, Front Mounted (if used).

Ⓒ Pneumatic Timer (if used).

Ⓓ Mechanical Latch (if used).

Ⓔ Provision for Steel Mounting Rail (35 mm).

* Add ½ inch for electrical clearance to enclosure.

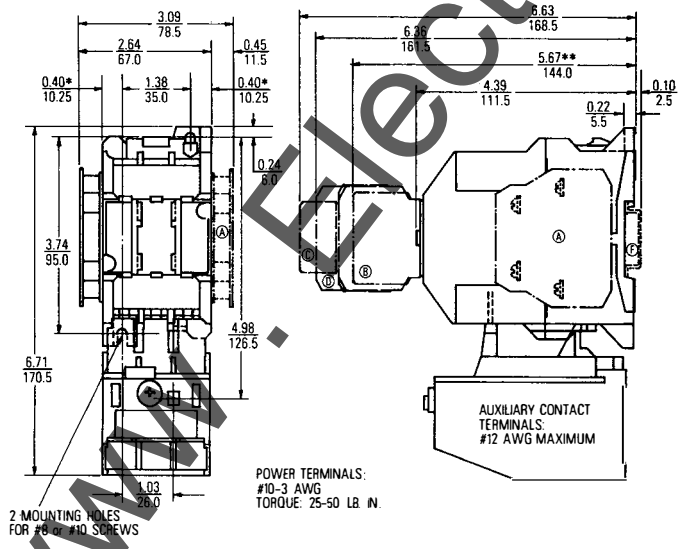
** Add ½ inch for electrical clearance to enclosure when using Ⓑ.

† Dimensions not applicable to CR7SE and CR7SF forms.

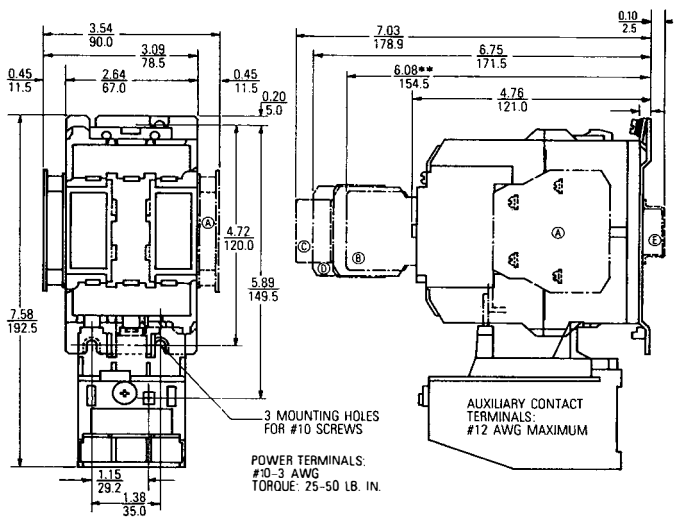
CR7SA, SB, SC, SE, and SF Open Type Starters–Fixed Heater Overload

Catalog Number	Approximate Dimensions													
	AA		AB		AC		AD		AE		BB		CC	
	In.	mm	In.	mm	In.	mm	In.	mm	In.	mm	In.	mm	In.	mm
CR7SA, SB, SC	5.24	133.0	2.76	70.0	3.84	97.5	0.31	8.0	3.52	89.4	4.35	110.5	5.37	136.5
CR7SE	5.53	140.5	2.95	75.0	3.84	97.5	0.33	8.5	3.80	96.5	4.90	124.5	6.00	152.5
CR7SF	5.53	140.5	2.95	75.0	3.94	100.0	0.33	8.5	3.80	96.5	4.86	123.5	5.88	149.3

Catalog Number	Approximate Dimensions				Wire Size (Power Terminals)	Torque (Main) Lb. In.	Approximate Shipping Wt., Lb.	Engineering Drawing Number
	DD		EE					
	In.	mm	In.	mm				
CR7SA, SB, SC	5.10	129.5	0.08	2.0	#16-10 AWG	10-15	1½	55-215067
CR7SE	5.73	145.5	0.09	2.4	#14-8 AWG	14-20	1¾	55-215068
CR7SF	5.61	142.5	0.09	2.4	#14-8 AWG	14-20	1¾	55-215069

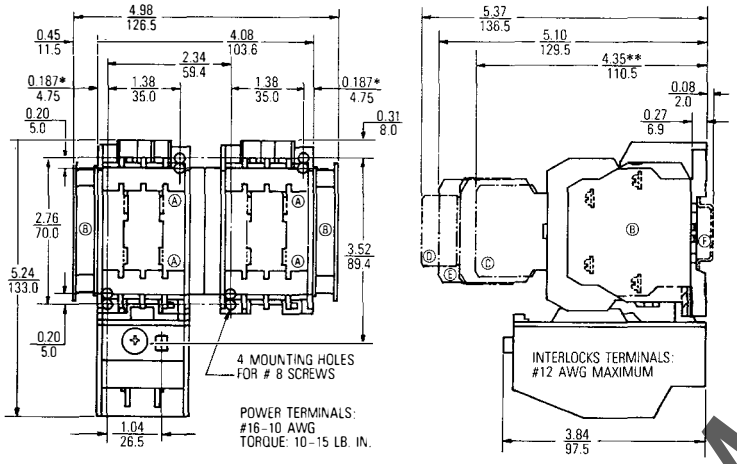


CR7SG, SH Open type starters–fixed heater overload.
Approx. shipping wt., 3 lb.
Engineering Drawing Number 55-215070



CR7SJ, SK Open type starters–fixed heater overload.
Approx. shipping wt., 3½ lb.
Engineering Drawing Number 55-215071

Dual Dimensions $\frac{\text{Inches}}{\text{Millimeters}}$ (For Estimating Only)—CR7V, Open AC Reversing Forms

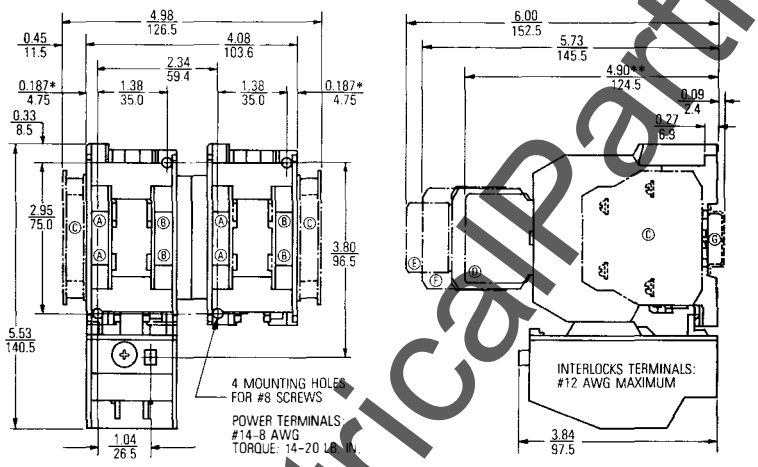


CR7VA, VB, VC Open type ac reversing starter. Approximate shipping wt., 3¼ lb.
Engineering Drawing Number 55-215077

Legend and Notes for CR7VA, VB, VC Illustration

Ⓐ Standard Holding Interlock.
Ⓑ Cross Electrical Interlock (Plus Extra Auxiliary Contacts, if used).
Ⓒ Extra Auxiliary Contacts, Front Mounted (if used).
Ⓓ Pneumatic Timer (if used).
Ⓔ Mechanical Latch (if used).
Ⓕ Provision for Steel Mounting Rail (35 mm).

* Add ½ inch for electrical clearance to enclosure.
** Add ½ inch for electrical clearance to enclosure when using Ⓒ.

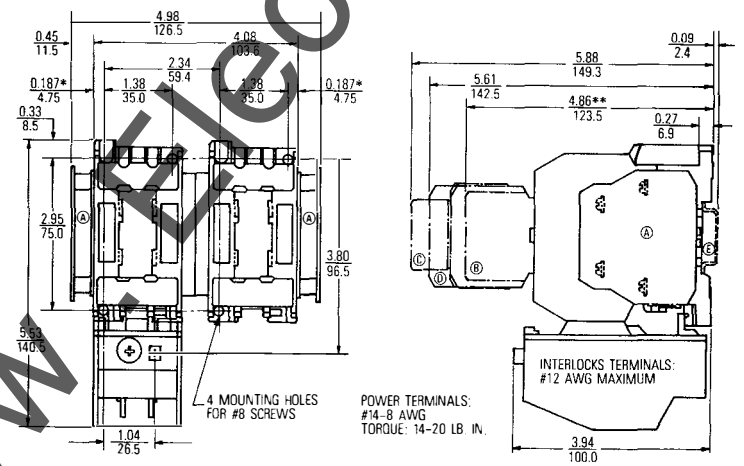


CR7VE Open type ac reversing starter. Approximate shipping wt., 3½ lb.
Engineering Drawing Number 55-215078

Legend and Notes for CR7VE Illustration

Ⓐ Standard Holding Interlock.
Ⓑ Cross Electrical Interlock.
Ⓒ Extra Auxiliary Contacts, Side Mounted (if used).
Ⓓ Extra Auxiliary Contacts, Front Mounted (if used).
Ⓔ Pneumatic Timer (if used).
Ⓕ Mechanical Latch (if used).
Ⓖ Provision for Steel Mounting Rail (35 mm).

** Add ½ inch for electrical clearance to enclosure.
** Add ½ inch for electrical clearance to enclosure when using Ⓓ.



CR7VF Open type ac reversing starter. Approximate shipping wt., 3¾ lb.
Engineering Drawing Number 55-215079

Legend and Notes for CR7VF Illustration

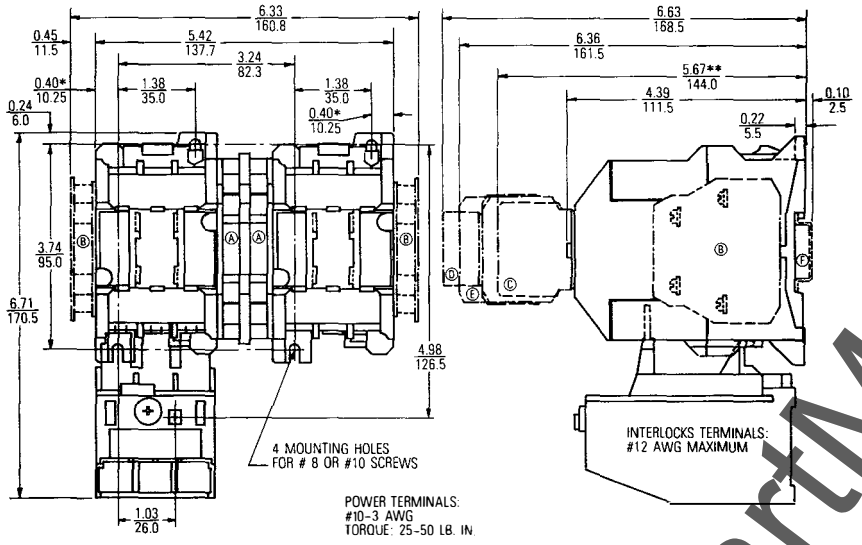
Ⓐ Standard Holding Interlocks and Cross Electrical Interlocks.
Ⓑ Extra Auxiliary Contacts, Front Mounted (if used).
Ⓒ Pneumatic Timer (if used).
Ⓓ Mechanical Latch (if used).
Ⓔ Provision for Steel Mounting Rail (35 mm).

* Add ½ inch for electrical clearance to enclosure.
** Add ½ inch for electrical clearance to enclosure when using Ⓑ.

Dimensions and Weights

CR7V Reversing Starters

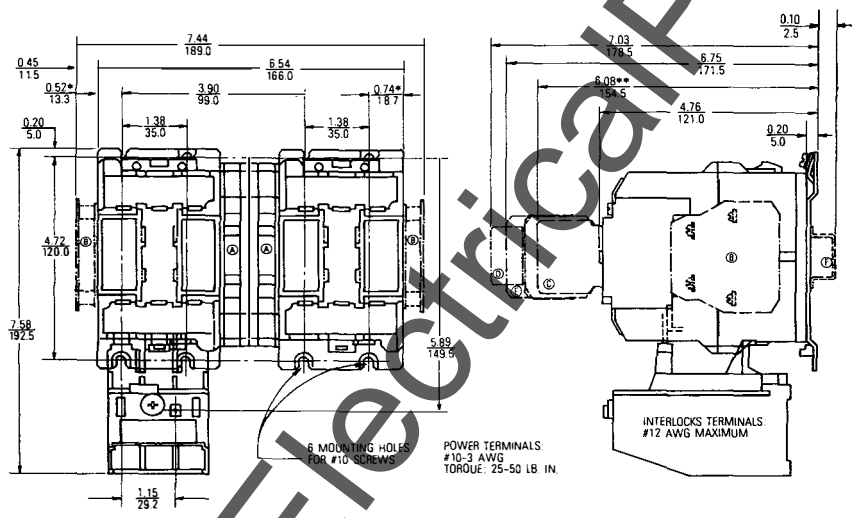
Dual Dimensions $\frac{\text{Inches}}{\text{Millimeters}}$ (For Estimating Only)—CR7V, Open AC Reversing Forms



CR7VG, VH Open type ac reversing starters. Approximate shipping wt., 4¼ lb.
Engineering Drawing Number 55-215075

Legend and Notes for CR7VG, VH Illustration

Ⓐ Standard Holding Interlocks and Cross Electrical Interlocks.
Ⓑ Extra Auxiliary Contacts, Side Mounted (if used).
Ⓒ Extra Auxiliary Contacts, Front Mounted (if used).
Ⓓ Pneumatic Timer (if used).
Ⓔ Mechanical Latch (if used).
Ⓕ Provision for Steel Mounting Rail (35 mm).
* Add ½ inch for electrical clearance to enclosure.
** Add ½ inch for electrical clearance to enclosure when using Ⓒ.



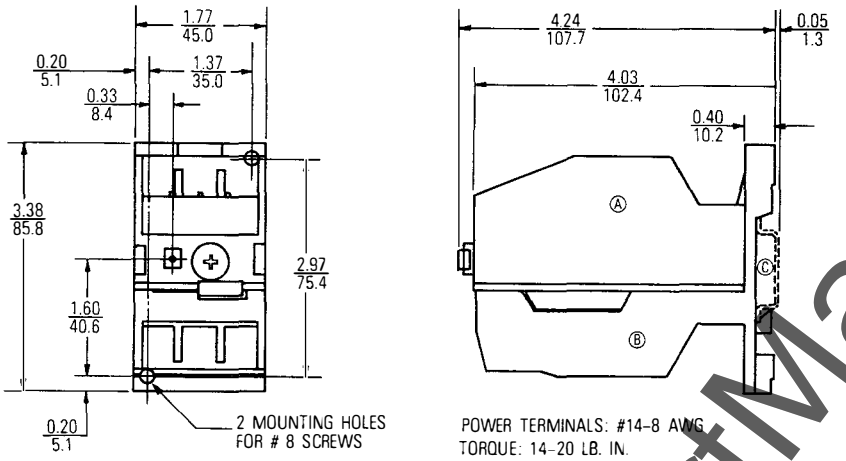
CR7VJ, VK Open type ac reversing starters. Approximate shipping wt., 8 lb.
Engineering Drawing Number 55-215076

Legend and Notes for CR7VJ, VK Illustration

Ⓐ Standard Holding Interlocks and Cross Electrical Interlocks.
Ⓑ Extra Auxiliary Contacts, Side Mounted (if used).
Ⓒ Extra Auxiliary Contacts, Front Mounted (if used).
Ⓓ Pneumatic Timer (if used).
Ⓔ Mechanical Latch (if used).
Ⓕ Provision for Steel Mounting Rail (35 mm).
** Add ½ inch for electrical clearance to enclosure.
** Add ½ inch for electrical clearance to enclosure when using Ⓒ.

Field Installed Accessories . . . Pages 16-18

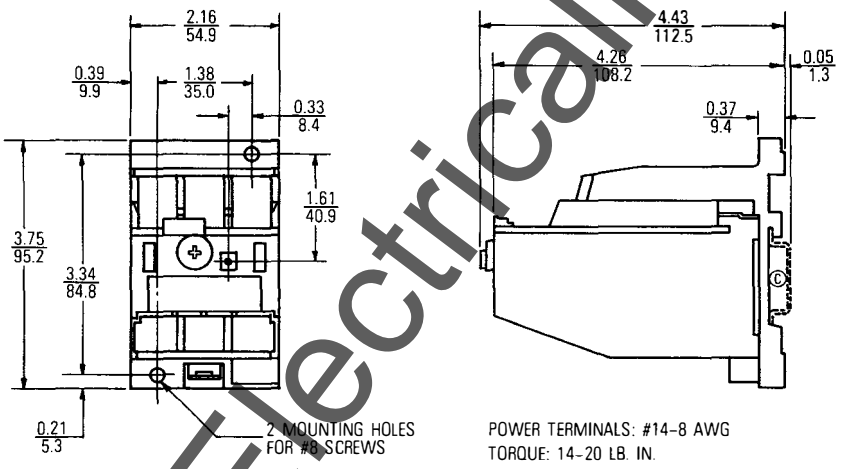
Dual Dimensions $\frac{\text{Inches}}{\text{Millimeters}}$ (For Estimating Only)—CR7G



Legend for All Panel-Mounted Fixed Heater Overload Relays

Ⓐ Overload Relay. (CR7G1T*, W*).
Ⓑ Socket. (CR7XY3)
Ⓒ Provision for Steel Mounting Rail (35 mm).

CR7G1T*, W* Panel-mounted, fixed heater overload relay plus mounting socket. Approximate shipping wt., 12 oz.

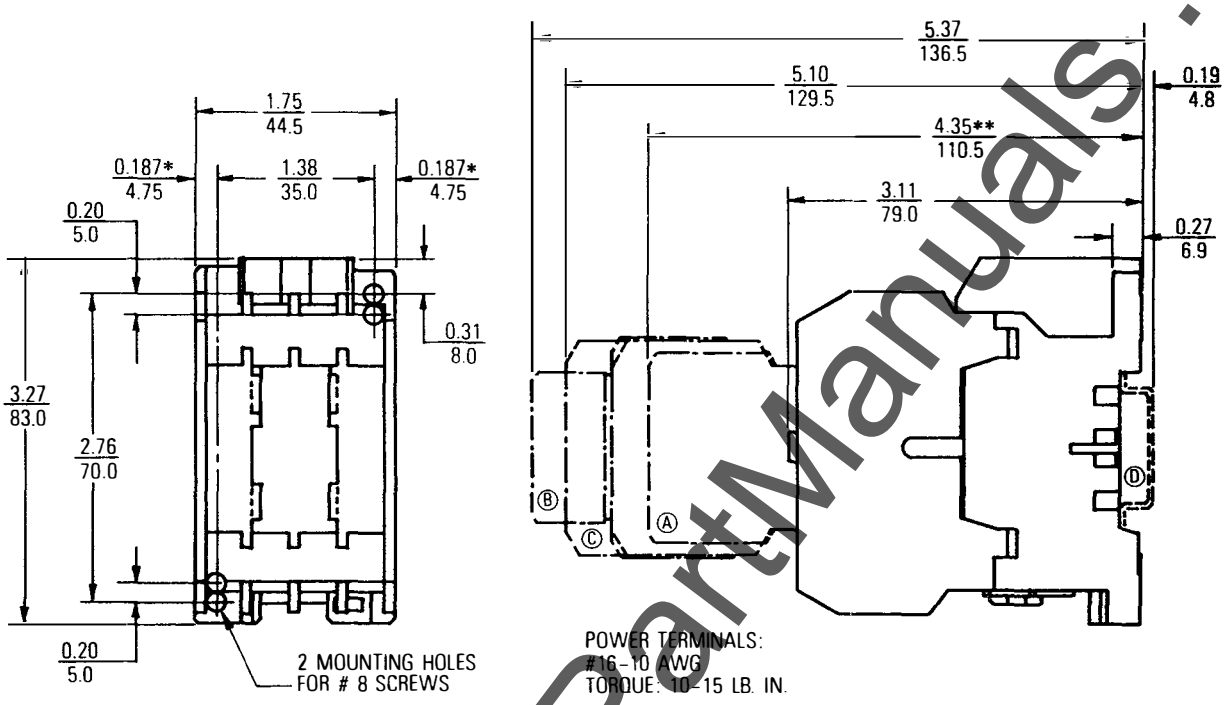


CR7G8 Panel-mounted, fixed heater overload relay. Approximate shipping wt., 1 lb.

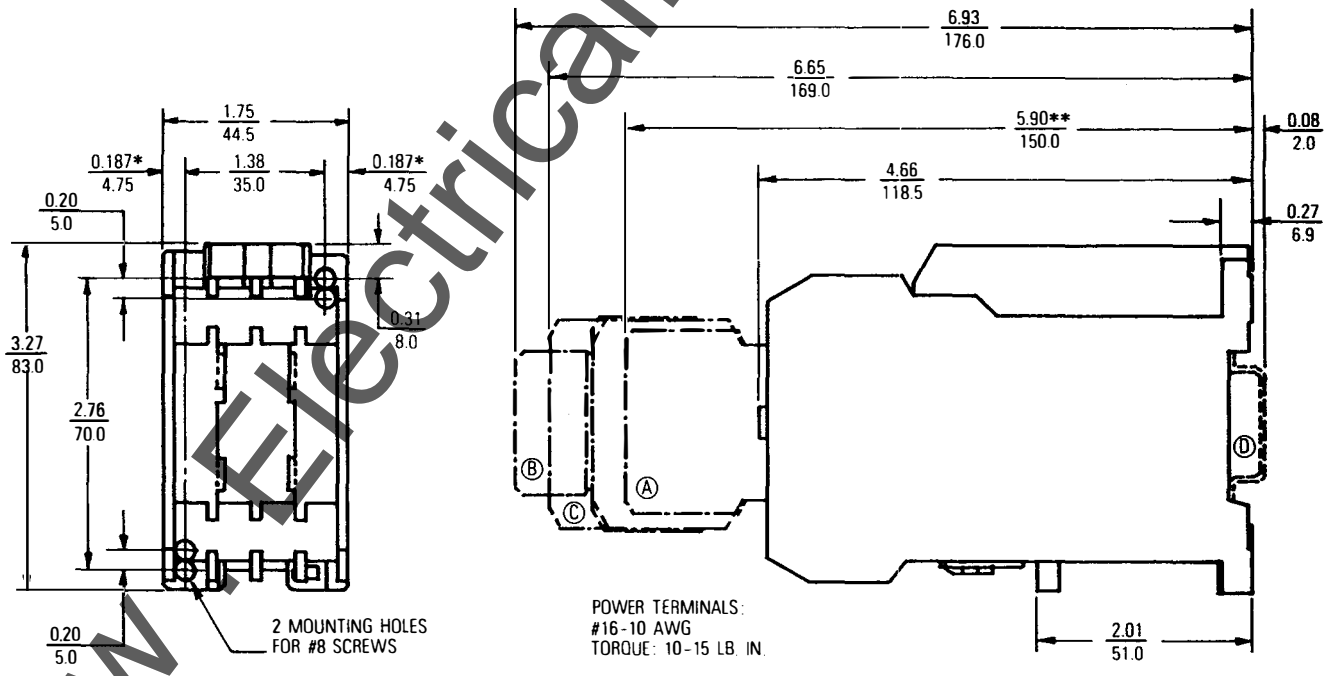
Dimensions and Weights

CR7R Control Relays

Dual Dimensions $\frac{\text{Inches}}{\text{Millimeters}}$ (For Estimating Only) —CR7R Control Relays–AC and DC Operated



CR7RA Control relay-ac operated. Approximate shipping wt., 1 lb.
Engineering Drawing Number 55-215061



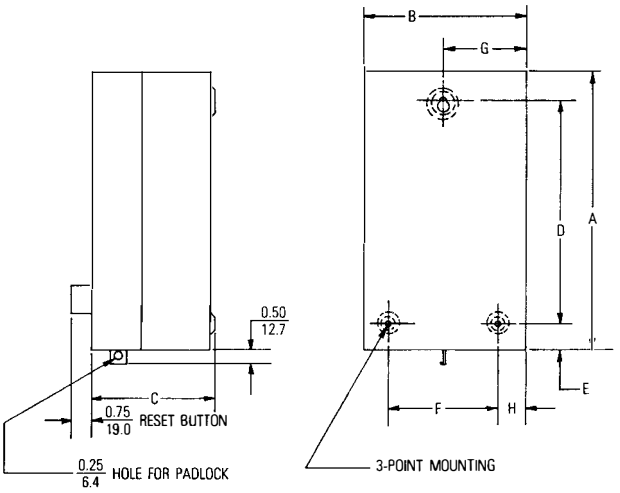
CR7RB Control relay-dc operated. Approximate shipping wt., 1¾ lb.
Engineering Drawing Number 55-215094

Legend and Notes for Both Illustrations

Ⓐ Adder Poles, Front Mounted.
Ⓑ Pneumatic Timer (if used).
Ⓒ Mechanical Latch (if used).
Ⓓ Provision for Steel Mounting Rail (35 mm).
* Add ½ inch for electrical clearance to enclosure.
** Add ½ inch for electrical clearance to enclosure when using Ⓐ.

Dimensions and Weights

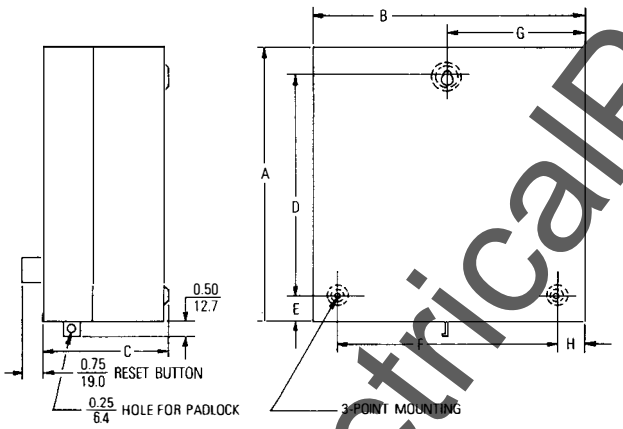
CR7XE Type 1 Enclosures



Enclosures Only for CR7C and CR7S Non-Reversing Contactors/Starters

Enclosure Catalog Number	Approximate Dimensions									
	A		B		C		D		E	
	In.	mm	In.	mm	In.	mm	In.	mm	In.	mm
CR7XEA1D, CR7XEA1A	10.00	254.0	6.00	152.4	4.63	117.5	8.00	203.2	1.00	25.4
CR7XEA1F	13.25	336.6	7.38	187.3	6.13	155.6	11.00	279.4	1.13	28.7

Enclosure Catalog Number	Approximate Dimensions						Mounting Screw Size	Approximate Shipping Wt., Lb.	Engineering Drawing Number
	F		G		H				
	In.	mm	In.	mm	In.	mm			
CR7XEA1D, CR7XEA1A	4.00	101.6	3.00	76.2	1.00	25.4	#10	1¾	55-215097
CR7XEA1F	5.00	127.0	3.69	93.7	1.19	30.2	¼"	5	55-215098



Enclosures Only for CR71V and CR7V Reversing Contactors/Starters ①

Enclosure Catalog Number	Approximate Dimensions									
	A		B		C		D		E	
	In.	mm	In.	mm	In.	mm	In.	mm	In.	mm
CR7XEA1B	10.00	254.0	10.00	254.0	4.62	117.3	8.00	203.2	1.00	25.4
CR7XEA1E, CR7XEA1G	13.25	336.5	12.00	304.8	6.13	155.7	11.00	279.4	1.13	28.7

Enclosure Catalog Number	Approximate Dimensions						Mounting Screw Size	Approximate Shipping Wt., Lb.	Engineering Drawing Number
	F		G		H				
	In.	mm	In.	mm	In.	mm			
CR7XEA1B	8.00	203.2	5.00	127.0	1.0	25.4	#10	4¾	55-215099
CR7XEA1E, CR7XEA1G	9.00	228.6	6.00	152.4	1.50	38.1	¼"	11¼	55-215301

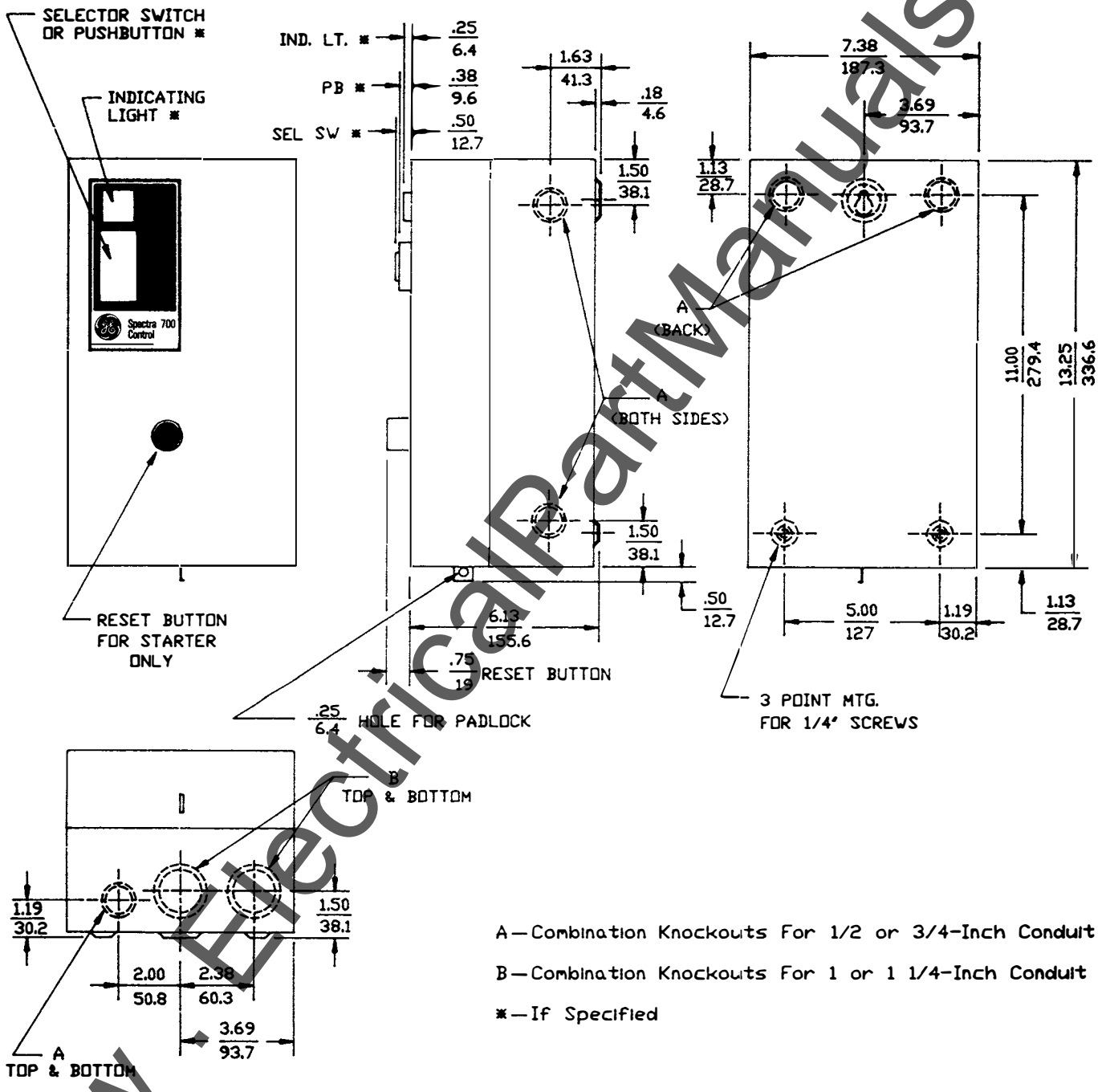
① Enclosures can also be used for non-reversing contactor/starter with control transformer.

Field Installed Accessories . . . . Pages 16-18

Dimensions

Type 1 Enclosures: CR7CG-K Contactors, CR7SG-K Starter

Dual Dimensions $\frac{\text{Inches}}{\text{Millimeters}}$ (For Estimating Only)



A—Combination Knockouts For 1/2 or 3/4-Inch Conduit

B—Combination Knockouts For 1 or 1 1/4-Inch Conduit

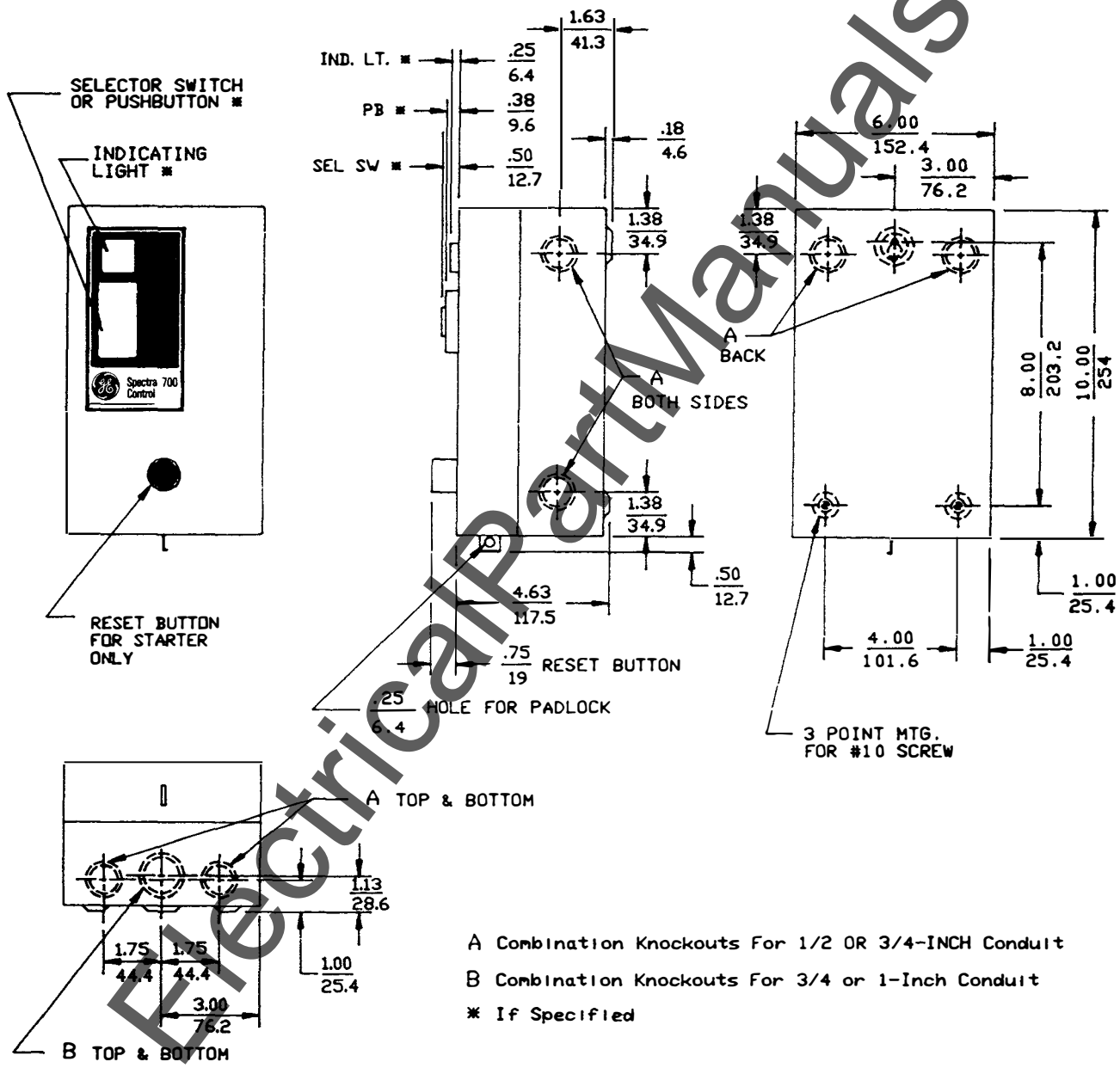
*—If Specified

Engineering Drawing Number 55-215098

Dimensions

Type 1 Enclosures: CR7CA-F Contactors, CR7SA-F Starter

Dual Dimensions $\frac{\text{Inches}}{\text{Millimeters}}$ (For Estimating Only)

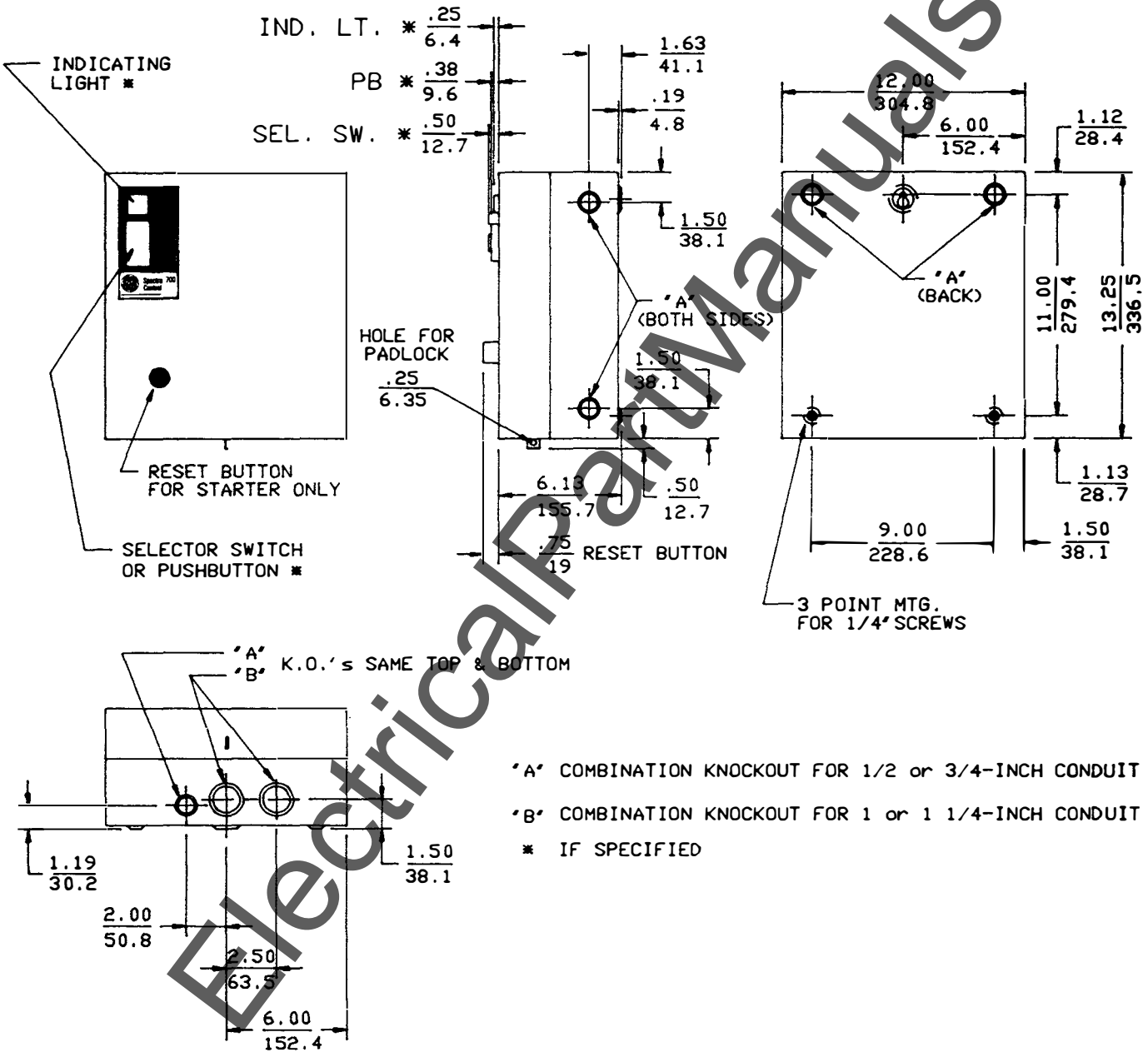


Engineering Drawing Number 55-215097

Dimensions

Type 1 Enclosures: CR7CG/K Contactors, CR7SG/K Starters

Dual Dimensions Inches / Millimeters **(For Estimating Only)**



'A' COMBINATION KNOCKOUT FOR 1/2 or 3/4-INCH CONDUIT

'B' COMBINATION KNOCKOUT FOR 1 or 1 1/4-INCH CONDUIT

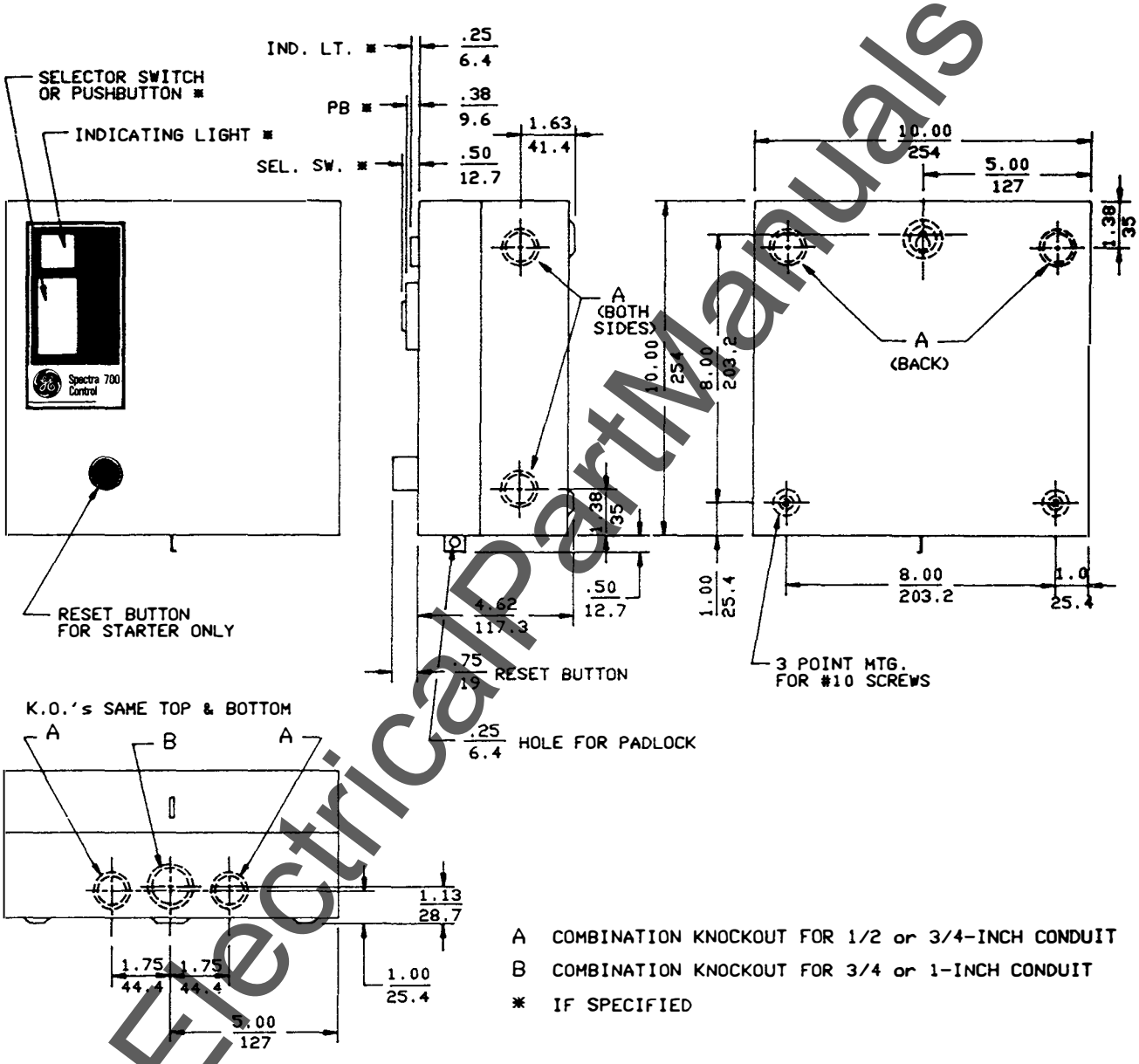
* IF SPECIFIED

Engineering Drawing Number 55-215301

Dimensions

Type 1 Enclosures: CR7CA-F Contactors, CR7SA-F Starters

Dual Dimensions $\frac{\text{Inches}}{\text{Millimeters}}$ (For Estimating Only)



A COMBINATION KNOCKOUT FOR 1/2 or 3/4-INCH CONDUIT

B COMBINATION KNOCKOUT FOR 3/4 or 1-INCH CONDUIT

✱ IF SPECIFIED

Engineering Drawing Number 55-210599

Guide Form Specifications

IEC control components shall be type GE Spectra 700™ Control. They shall be listed by Underwriters Laboratories (UL), certified by Canadian Standards Association (CSA) and conform to International Electrotechnical Commission (IEC) standards. All control relays and auxiliary contacts shall conform to the applicable requirements of NEMA standard ICS 2 for AC and DC control circuit contacts. Enclosures shall be listed by UL and certified by CSA. Ampere, voltage and all other ratings shall be clearly marked. In addition, all contactors and relays should have these standard features:

- 20 million mechanical operations through 20 hp @ 460V.
- 15 million mechanical operations above 20 hp @ 460V.
- All inclusive hp ratings through 50 hp @ 460V.
- Built-in finger and back of hand protection from live conductors.
- Common coil through 20 hp @ 460V.
- DIN rail mounting through 50 hp @ 460V.
- Encapsulated coils available in all frame sizes.
- Withdrawable coil available 25 through 50 hp @ 460V.
- IEC (Class 10) overload relays available for all frame sizes.
- Inspectable contacts 20 hp @ 460V and above.
- Replaceable contacts 25 hp @ 460V and above.
- Mechanical interlocks with integral cross electrical interlocks for contactors 25 hp @ 460V above.
- Key-hole and slotted mounting holes 25 hp @ 460V and above.
- Easy coil changeout for replacement or voltage change.
- One normally closed plus one normally open isolated contact on all Class 10 overload relays.
- Overload relays reset on upstroke (automotive specification).
- Terminals in open position for ease of wiring.
- Side and top mount auxiliary contacts.
- Single phase differential protection on all Class 10 overload relays.
- Snap on accessories (no additional fasteners required).
- Standard straight blade or Phillips-head screws.
- Timer and overload transparent cover (prevents tampering with adjustment).
- Top located coil terminals.
- Visible trip indication on all overload relays.
- Timer convertible for either time delay on energization or de-energization.
- Fourth and fifth adder power pole with and without integrated mechanical interlock for special purpose and two speed-one winding applications.

GE Electrical Distribution & Control

General Electric Company
41 Woodford Ave., Plainville, CT 06062

GEP-969A 0291 BLG