

Vacuum Contactors
Cutler-Hammer® series

Rugged, compact
and lightweight
for switching of
low voltage three
phase AC motors.



EATON

Powering Business Worldwide



Aerospace



Truck



Powering business worldwide

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Since 1911, when our company began trading as a small truck parts supplier, Eaton® Corporation has come a long way. Today, as a diversified power management company, Eaton has sales of \$11.9 billion USD (FY 2009), employs 70,000 people and has customers in more than 150 countries. Everyday, we help companies across the world to manage power, and do more, while consuming less energy.

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A global leader in electrical control, power distribution, uninterruptible power supply and industrial automation products and services. Our products provide customer-driven PowerChain Management® solutions to serve the power system needs of the industrial, institutional, government, utility, commercial, residential, IT, mission critical and OEM markets worldwide.



Powering Business Worldwide



Electrical



Automotive



Hydraulics

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Sustainability – smaller footprint in the world

The principle of sustainability means meeting the current needs of our own society without compromising the needs or options of future generations. It is a principle, which forms the very core of our design and production philosophy and guides all our activities across the world. Our commitment to reducing our own ecological footprint covers a wide range of green technologies, products and services that help our customers utilise electrical power more efficiently, while improving environmental performance.

Eaton has been recognised throughout the world for its uncompromising business ethics. For example, it was listed as one of the 'World's Most Ethical Companies' on the Ethisphere Institute's annual list for three consecutive years (2007, 2008 and 2009).

Automotive

A supplier of critical components that reduce emissions and fuel consumption and improve stability and performance of cars, light trucks and commercial vehicles. Principal products include engine valves and valve train components, transmission and engine controls, supercharger, locking and limited slip differentials, cylinder heads, fluid conveyance components, body mouldings and spoilers.

Hydraulics

A worldwide leader in reliable, high-efficiency hydraulic systems and components for use in mobile and industrial applications. Markets include agriculture, construction, mining, forestry, utility, material handling, earth moving, truck and bus, machine tools, moulding, primary metals, automotive, power generation, port machinery and entertainment.



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Complete coverage of the market – worldwide in all standards

Local market leader with global competence

Eaton's product series are distinguished by their strong presence in all regions of the world. In markets that adhere to IEC standards, Eaton's Moeller® series is very well established, and in the world of UL/CSA, Eaton is a key player, for example with its Cutler-Hammer® series. Now all customers are benefiting from first-rate engineering and the combined know-how in research and development – no matter which standards they use.

South Africa

Eaton acquired the CHI Control business through the acquisition of Actom Low Voltage, South Africa in July 2011. In terms of organisation, product and production techniques, CHI Control is being fully integrated into Eaton, adopting the Eaton Business System, a single system covering work processes, tools and tooling. The CHI Control logo is now being replaced by the Eaton logo on product rating and carton labels and associated marketing materials with a phased completion date of 1 July 2013. The CHI Control name and logo remain registered trademarks of Eaton Corporation.



NEMA, Special Purpose and Mining Rating



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NEMA, Special Purpose and Mining Rating

Product Description

Vacuum contactors and starters were designed for starting and controlling three-phase, 50/60 Hz, AC motors. Each contact is enclosed in a vacuum bottle to reduce and contain contact arcing. This design offers excellent performance for plugging and jogging applications.

Application Description

The vacuum contactors and starters are offered in three classifications. They are NEMA rated devices up to 600 Vac, Special Purpose rated devices up to 1500 Vac and Mining rated devices rated up to 1500 Vac. Each device is tested to different standards to serve its market.

Typical applications include full voltage control of three-phase squirrel cage motors, primary control of low voltage wound rotor motors and circuit switching for low voltage capacitors for power factor improvement.

A vacuum contactor is affected by atmospheric pressure on the bellows of the vacuum bottles. Up to an altitude of 2000m, the contactor is designed to tolerate normal variations in barometric pressure. If the contactor is to be operated above 2000m above sea level, consult your Eaton representative.

Operation

The contact structure of the vacuum break contactor is located inside sealed ceramic tubes that have been evacuated of air. Any arc occurring across the contacts upon opening is automatically extinguished because ionized air is not available to sustain it—the arc breaks when the current passes through zero. The arc typically does not service beyond the first half cycle once the contacts begin to separate. The large arc chutes normally associated with contactors of this size are not required. The ceramic tube with the moving and stationary contacts is called a **vacuum interrupter or bottle**. There is one bottle for each pole on the contactor. A metal bellows (like a small, circular accordion) within the bottle allows the moving contact to be closed and pulled open from the outside without leaking air into the bottle. Both the bellow and the metal-to-ceramic seals of these state-of-the-art bottles have been refined to the point where the possibility of loss of vacuum has been virtually eliminated.

Features

- Rugged, compact and lightweight
- Quiet operation
- Electrical and mechanical interlocks available
- Long service life

Benefits

- Easy maintenance with front removable coil and auxiliaries
- Eliminate extra surge suppressors with the standard low chop interrupters
- Plan your preventative maintenance schedule by utilizing the contact wear indicator, standard on all vacuum bottles

Standards and Certifications

- NEMA Devices
 - UL Listed File #E1491, Guide Number NLDX
 - CSA Approved
- Special Purpose Devices
 - IEC 947-4-1
 - CE Approved EN 60947-4-1
 - UL Listed File #E1491, Guide Number NLDX
 - CSA Approved



1.1

Vacuum Contactors

NEMA, Special Purpose and Mining Rating

1

Product Selection

When Ordering Specify

- Eaton part number
- Heater pack if ordering a starter, order in quantities of three
- Any required accessories

Size 4 Vacuum Contactor



NEMA Rated Vacuum Contactors

NEMA Size	Ampere Rating	Motor Voltage	Maximum kW Rating	Magnet Coil Voltage [Ⓞ]	Contactors Non-Reversing Eaton Part Number
4	135	200	30	110/120	V201K4CJ
		230	37	220/240	V201K4CK
		380	55		
		460	75	440/480	V201K4CU
		575	75		
5	270	200	55	110/120	V201K5CJZ1
		230	75	220/240	V201K5CKZ1
		380	110		
		460	150	440/480	V201K5CUZ1
		575	150		
6	540	200	110	110/120	V201K6CJZ1
		230	150	220/240	V201K6CKZ1
		380	220		
		460	300	440/480	V201K6CUZ1
		575	300		

160A Vacuum Contactor



Special Purpose Vacuum Contactors

Ampere Rating	Motor Voltage	Maximum kW Rating	Magnet Coil Voltage [Ⓞ]	Contactors Non-Reversing Eaton Part Number
160	200	37	110/120	V201KRCJ
	230	45	220/240	V201KRCK
	380	75		
	460	90	380/415	V201KRCH
	575	110	440/480	V201KRCU
	800	150		
	1500	300		
320	200	75	110/120	V201KTCJZ1
	230	90	220/240	V201KTCKZ1
	380	150		
	460	185	380/415	V201KTCHZ1
	575	220	440/480	V201KTCUZ1
	795	300		
	1500	600		
540 [Ⓞ]	200	110	110/120	V201KVCJZ1
	230	150	220/240	V201KVCKZ1
	380	220		
	460	300	380/415	V201KVCHZ1
	575	375	440/480	V201KVCUZ1
	795	550		
	1500	975		
610	200	150	110/120	V201KZCJZ1
	230	150	220/240	V201KZCKZ1
	380	220		
	460	335	380/415	V201KZCHZ1
	575	375	440/480	V201KZCUZ1
	795	600		
	1500	1200		

Notes

- Ⓞ Coils are rated for 50/60 Hz applications.
- Ⓞ The 540A device does not carry CE or IEC ratings.

160A Mining Vacuum Contactor



Mining Rated Vacuum Contactors

Ampere Rating	Motor Voltage	Maximum kW Rating	Magnet Coil Voltage [Ⓞ]	Contactors Non-Reversing Eaton Part Number
160	200	37	110/120	VM160CJ
	230	45	220/240	VM160CK
	380	75		
	460	90	440/480	VM160CU
	575	110		
	800	150		
320	1500	300		
	200	75	110/120	VM320CJZ1
	230	90	220/240	VM320CKZ1
	380	150		
	460	185	440/480	VM320CUZ1
	575	220		
795	300			
610	1500	600		
	200	110	110/120	VM610CJZ1
	230	150	220/240	VM610CKZ1
	380	220		
	460	300	440/480	VM610CUZ1
	575	375		
795	550			
	1500	975		

Accessories

Lug Sizes

- Size 4—12-4/0
- NEMA Size 5 and 6 and 320A, 540A and 610A—supplied without line or load lugs.

Lug Kits—Consist of Six Lugs

Size	Description	Eaton Part Number
5 and 320A	1/0–500 kcmil	C325KAL8
6, 540A and 610A	1/0–500 kcmil double barrel	C325KAL9
610A	1/0–600 kcmil double barrel	80-19825-2

Field Modification Kits

Auxiliary Electrical Contacts

Size 4—Three Type J auxiliary contacts may be mounted on the top of Size 4 contactors to provide six auxiliary, isolated 600V, 10A contacts for use in control circuits.

Sizes 5–6—Two Type J auxiliary contacts may be mounted on each side of Size 5 and 6 contactors to provide four auxiliary, isolated 600V, 10A contacts for use in control circuits.

Auxiliary Electrical Contacts

Contact Arrangement	Eaton Part Number
1NO, 1NC	J11
2NO	J20
2NC	J02

Horizontal Mechanical Interlock

Size	Eaton Part Number
4	180C113G04
5	180C113G16
5	180C113G17

Note

Ⓞ Coils are rated for 50/60 Hz applications.

1 Technical Data and Specifications

NEMA, Special Purpose and Mining Rating

Description	NEMA			Special Purpose			
	Size 4 V201K4_	Size 5 V201K5_	Size 6 V201K6_	160A V201KR_	320A V201KT_	540A V201KV_	610A V201KZ_
Poles	3	3	3	3	3	3	3
Maximum voltage rating	600V	600V	600V	1500V	1500V	1500V	1500V
Ampere rating	135A	270A	540A	160A	320A	540A	610A
Frequency, Hz	50/60	50/60	50/60	50/60	50/60	50/60	50/60
Maximum closing current	1600A	3000A	6000A	1600A	3000A	6000A	6000A
Maximum interrupting current	1600A	3000A	6000A	1600A	3000A	6000A	6000A
Short time current							
1 second	2400A RMS	4500A RMS	9000A RMS	2400A RMS	4500A RMS	9000A RMS	9000A RMS
2 second	1600A RMS	3000A RMS	6000A RMS	1600A RMS	3000A RMS	6000A RMS	6000A RMS
Dielectric strength	2200 Vac	5375 Vac	5375 Vac	2200 Vac	5375 Vac	5375 Vac	5375 Vac
Maximum allowable interrupting	1200/Hr.	—	—	1200/hr.	—	—	—
Impulse voltage (1 x 40 ms)	15 kV	15 kV	15 kV	15 kV	15 kV	15 kV	15 kV
Maximum motor kW at:							
200V	30 kW	55 kW	110 kW	37 kW	75 kW	110 kW	150 kW
230V	37 kW	75 kW	150 kW	45 kW	90 kW	150 kW	150 kW
380V	55 kW	110 kW	220 kW	75 kW	150 kW	220 kW	220 kW
460V	75 kW	150 kW	300 kW	90 kW	185 kW	300 kW	375 kW
575V	75 kW	150 kW	300 kW	110 kW	220 kW	300 kW	375 kW
800V	—	—	—	150 kW	300 kW	—	600 kW
1000V	—	—	—	185 kW	—	—	750 kW
1500V	—	—	—	300 kW	600 kW	975 kW	1200 kW
Three-phase capacitive switching (kVAR):							
230V	0 kVAR	80 kVAR	160 kVAR	50 kVAR	80 kVAR	160 kVAR	176 kVAR
460V	80 kVAR	160 kVAR	320 kVAR	100 kVAR	160 kVAR	320 kVAR	356 kVAR
600V	100 kVAR	200 kVAR	400 kVAR	125 kVAR	200 kVAR	400 kVAR	400 kVAR
1500V	—	—	—	205 kVAR	500 kVAR	—	1000 kVAR
Transformer switching (kVA) [Ⓞ] single-phase, two-pole:							
120V	6.8 kVA	14 kVA	27 kVA	8 kVA	14 kVA	27 kVA	27 kVA
240V	14 kVA	27 kVA	54 kVA	16 kVA	27 kVA	54 kVA	54 kVA
480V	27 kVA	54 kVA	108 kVA	32 kVA	54 kVA	108 kVA	108 kVA
600V	34 kVA	68 kVA	135 kVA	40 kVA	68 kVA	135 kVA	135 kVA
Three-phase, three-pole:							
240V	23 kVA	47 kVA	94 kVA	27 kVA	47 kVA	94 kVA	94 kVA
480V	47 kVA	94 kVA	188 kVA	55 kVA	94 kVA	188 kVA	188 kVA
600V	59 kVA	117 kVA	234 kVA	70 kVA	117 kVA	234 kVA	234 kVA

Note

[Ⓞ] For transformers having inrush currents of not more than 20 times the rated full load current.

Electrical Characteristics—NEMA and Special Purpose Types

Description	Size		
	4 (160A)	5 (320A)	6 (540A and 610A)
DC coil data—burden: (AC supply rectified)			
Open VA	300 VA	500 VA	1450 VA
Closed VA	30 VA	25 VA	32 VA
Closed watts	6W	20W	30W
Pick-up volts	70% of rated coil volts	70% of rated coil volts	70% of rated coil volts
Drop-out volts	50% of rated coil volts	50% of rated coil volts	50% of rated coil volts
Pick-up time in Hz	1.5–2 Hz	1.5–2 Hz	1.5–2 Hz
Drop-out time in Hz	6–6.15 Hz	6–6.15 Hz	6–6.15 Hz
Maximum voltage rating	600V	600V	600V
Maximum closing current	1600A	3000A	6000A
Maximum interrupting current	1600A	3000A	6000A
Short time current:			
1 second	2400A RMS	4500A RMS	9000A RMS
2 second	1600A RMS	3000A RMS	6000A RMS

Electrical Characteristics Coil Data (AC Supply Rectified)

Burden	Size		
	4 (160A)	5 (320A)	6 (540A and 610A)
Inrush VA	300	600	1700
Sealed VA	30	20	28
Sealed watts	6	20	28
Pick-up volts	70% of rated coil volts	70% of rated coil volts	70% of rated coil volts
Drop-out volts	50% of rated coil volts	50% of rated coil volts	50% of rated coil volts
Pick-up time in Hz	1.5–2	1.5–2	1.5–2
Drop-out time in Hz	6–7.5	6–6.15	6–6.15

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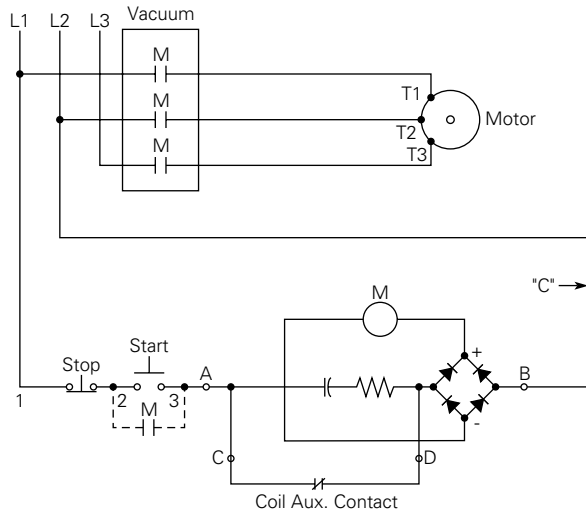
Vacuum Contactors

NEMA, Special Purpose and Mining Rating

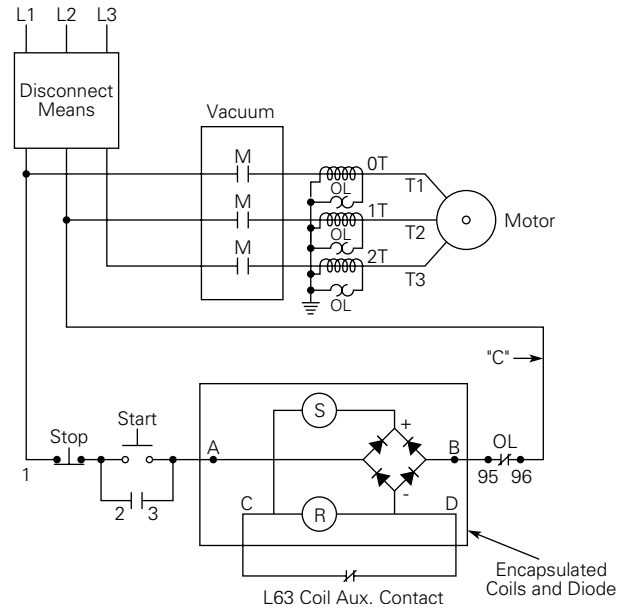
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Wiring Diagrams

Size 4 Contactor



Sizes 5 and 6 Starter

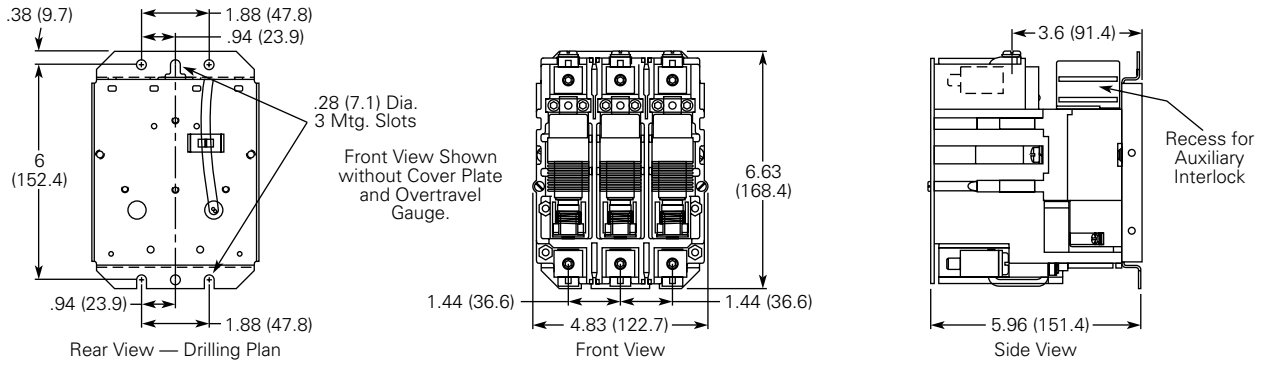


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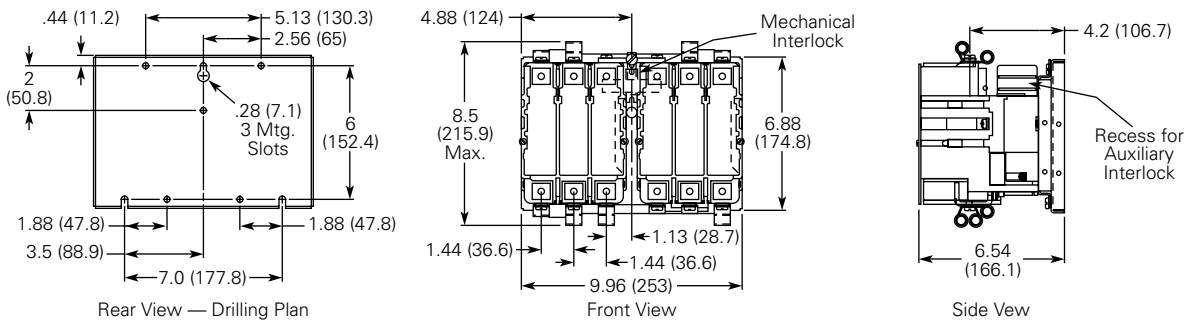
Approximate Dimensions in Inches (mm)

Open Type Contactors—Size 4 and 160A

Size and 160A Non-Reversing Contactor



Size 4 and 160A Reversing Contactor



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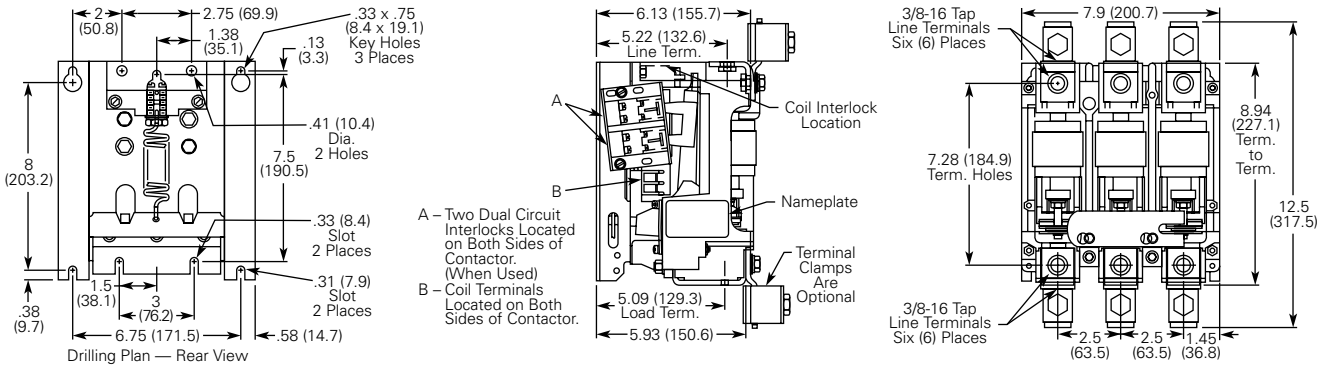
Vacuum Contactors

NEMA, Special Purpose and Mining Rating

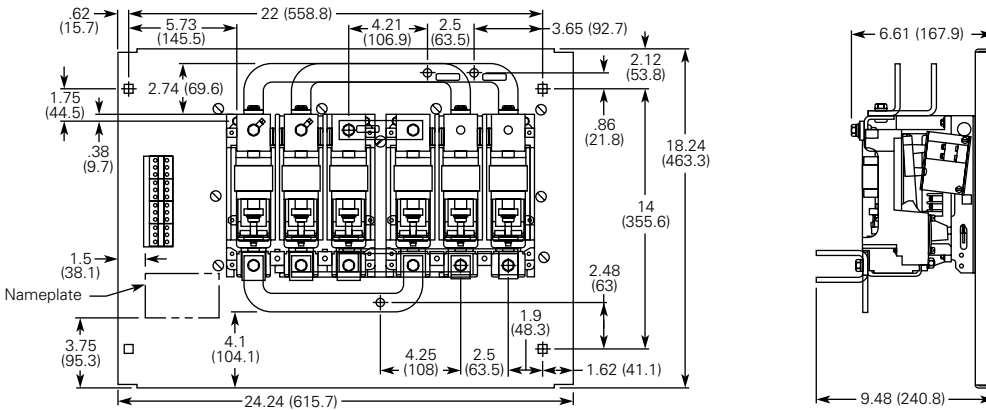
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Open Type Contactors—Size 5 and 320A

Size 5 and 320A Non-Reversing Contactor



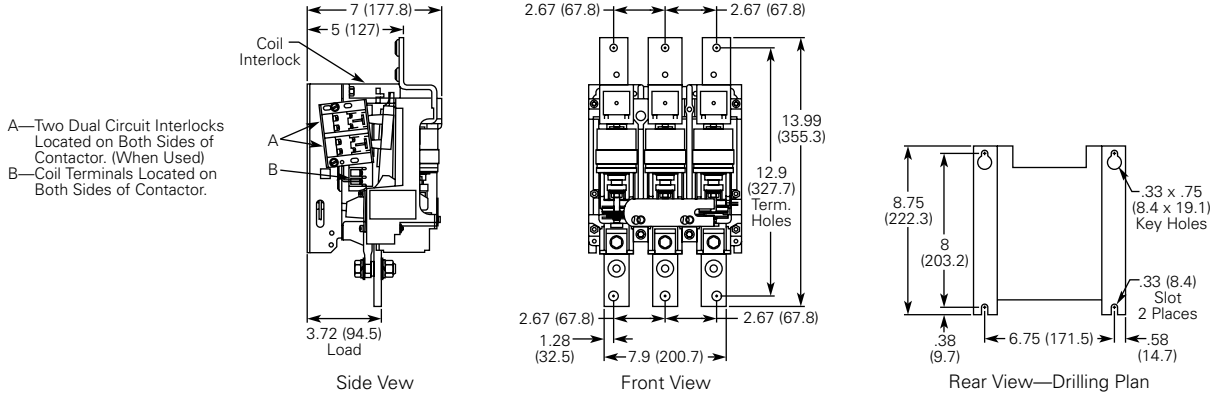
Size 5 and 320A Reversing Contactor



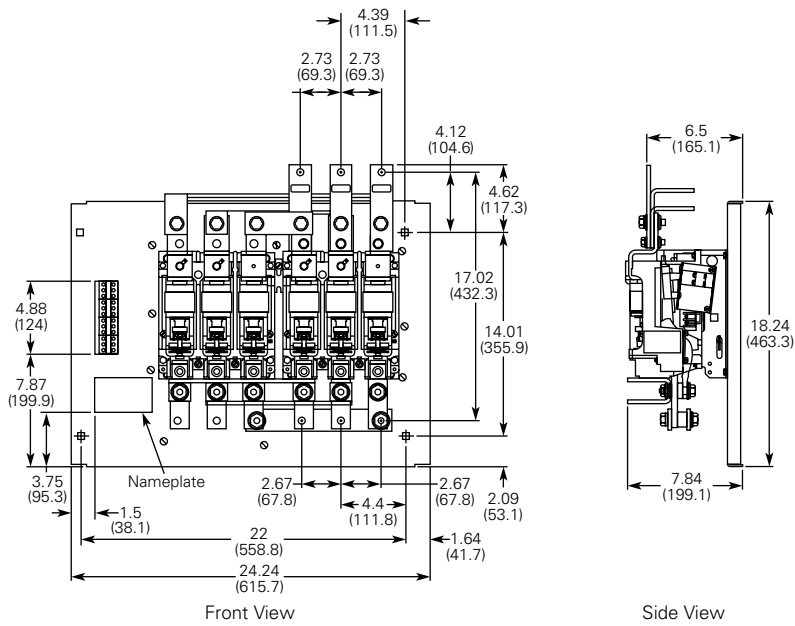
Approximate Dimensions in Inches (mm)

Open Type Contactors—Size 6, 540A and 610A

Size 6, 540A and 610A Non-Reversing Contactor

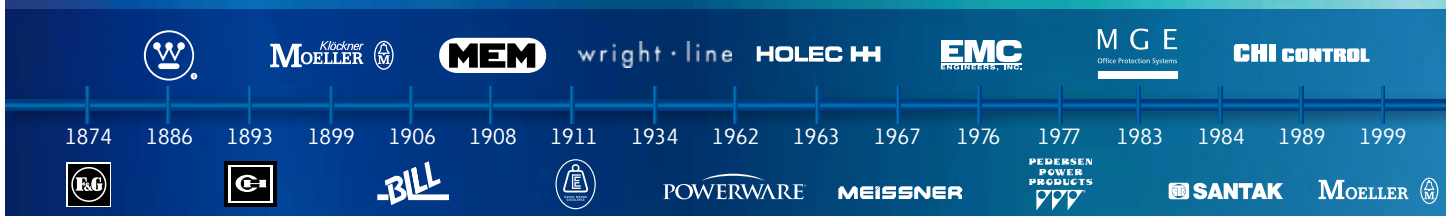


Size 6, 540A and 610A Reversing Contactor



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