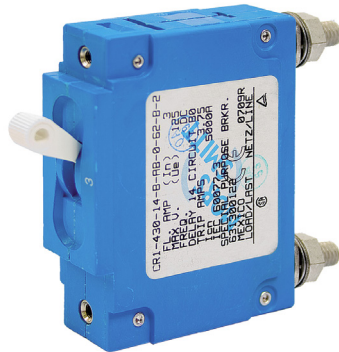


/// CR Circuit breaker, hydraulic magnetic

Rugged circuit breaker for extreme reliability, within long endurance applications and harsh environments

CR

Circuit breaker



Features

- Precise, temperature independent operation
- Panel mount
- Integrated auxiliary contacts (optional)
- Up to 6 poles configuration
- High interrupting capacities due to unique arc chute method
- Mid-trip handle for electrical trip indication (optional)
- Immediate resetting possible
- Wide current range: 0.02 - 100 A
- Wide choice of time delays
- Maximum voltage 137.5 VDC / 484 VAC
- High contact pressure & longer contact life due to wiping self-cleaning contacts

Description

Compact hydraulic magnetic circuit breaker for railway applications, to protect electronic equipment and components against unintended high currents. Optional with integrated auxiliary contacts to monitor the circuit.

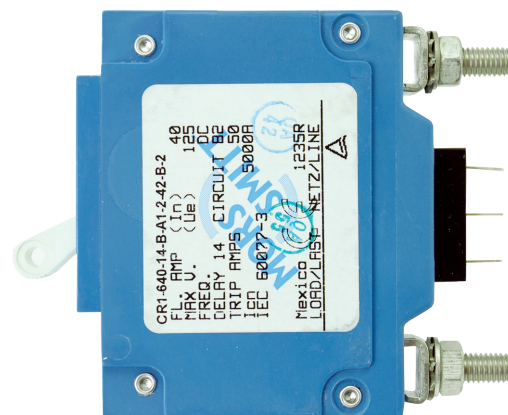
The trip point is always at maximum allowable current, independent of ambient temperature. Mid-trip handle to indicate clearly a breaker operation caused by electrical fault. With unique arc chute design which results in high interrupting capacities. Up to 6 poles which all break its electronic circuits when 1 breaker trips, for optimal protection of the system. Wide range of currents and options available.

Application

To be used in every application where electrical systems, circuits or components must be protected against too high currents. This situation can occur, when under strained or heavy use a motor or other load-generating component within the equipment will draw additional current from the power source. High currents cause the wires or components to overheat and ultimately burn up.

A circuit protection device should be employed at any point where a conductor size changes. Many electronic circuits and components like transformers have a lower overload withstand threshold level than conductors such as wires and cables. These components require circuit protection devices featuring very fast overload sensing and opening capabilities.

The CR-Series circuit breaker can be used in all Railway applications where protection against overload and short circuit is necessary, for example HVAC systems, (door) control systems, braking systems, passenger information systems, etc.



Railway compliancy

All our circuit breakers are designed according
EN 50155

IEC 60077 - 1/2/3/4 NF F 62-001 - 1/2/3

IEC 61373 NF F61-010

EN 50124-1 IEC 60068-2-30

EN 45545-2 IEC 60068-2-52

IEC 60947-2 MIL-STD-202G Method 107D, condition A

NF F16-101/102 MIL-STD-202G Method 106D

Circuit breaker CR

Technical specifications

Electrical characteristics

Application voltage	DC for 1-6 poles		AC for 1 pole	AC for 2-6 poles
Rated voltage	12 - 110 VDC		12 - 230 VAC	12 - 400 VAC
Min. operating voltage	8.4 VDC		10.8 VAC	10.8 VAC
Max. operating voltage	137.5 VDC		253 VAC	484 VAC
	Remark: 8.4 - 125 VDC: max 100 A 125 - 137.5 VDC: max 70 A			
Current ratings	0.02 - 100 A (other ratings on request)			
Voltage coils	6 VDC - 65 VDC / 6 VAC - 240 VAC (other ratings on request)			
Dielectric strength	5000 VAC, 50/60 Hz for 1 minute between all electrically isolated terminals			
Creepage and clearance	EN 50124-1 8 mm spacing requirements from hazardous voltage to operator accessible surfaces, between adjacent poles and from main circuits to auxiliary circuits			
Insulation resistance	Minimum of 100 MΩ @ 500 VDC			
Operating frequency	50/60 Hz, DC			
Max. interrupting cap.	IEC 60077	5000 A @ 125 VDC, 1 - 70 A 4500 A @ 415 VAC, 1 - 60 A 4000 A @ 415 VAC, 61 - 100 A		
	IEC 60947-2	6000 A @ 240 VAC, 1 - 70 A 4500 A @ 240 VAC, 71 - 100 A 6000 A @ 415 VAC, 1 - 30 A 4500 A @ 415 VAC, 31 - 70 A		
	IEC 60934	5000 A @ 80 VDC, 0.1 - 100 A 5000 A @ 125 VDC, 1 - 60 A 5000 A @ 250 VAC, 0.1 - 100 A		
	UL 489	10000 A @ 80 VDC, 0.02 - 100 A		
Auxiliary switch	Integrated, load side. SPST. Auxiliary switch senses the on-off position of circuit breaker handle, as well as the open-closed position of breaker contact.			
		Silver auxiliary contacts	Gold auxiliary contacts	
	AC min. switching cap.	5 - 20 VAC: 100 mA ≥ 20 VAC: 10 mA	5 mA / 5 VAC	
	AC max. switching cap.	5 A / 125 VAC	100 mA / 125 VAC	
	DC min switching cap.	≤ 20 VDC: 100 mA ≥ 20 VDC: 10 mA	5 mA / 5 VDC	
	DC max. switching cap.	3 A / 32 VDC 100 mA / 125 VDC (max. 2000 cycles)	100 mA / 32 VDC 2 mA / 110 VDC (max. 2000 cycles)	
	All loads mentioned are resistive loads.			

Circuit breaker

CR

General characteristics

Number of poles	1, 2, 3, 4, 5 or 6 poles For DC and AC applications: 1-2 poles ≤ 100 A 3-6 poles ≤ 70 A																									
Terminals	Stud / screw / double faston	See circuit & terminal diagrams.																								
Auxiliary contacts	Faston or solder type	See circuit & terminal diagrams.																								
Mounting	The hydraulic-magnetic circuit breakers of Mors Smitt can be mounted in any position. A hydraulic-magnetic breaker is designed to “must hold” at 100% of the breaker's current rating and is calibrated to “must trip” at 125% of the breaker's current rating. If the mounting position is +90 degrees from a vertical panel mount (handle facing down, ceiling mount position) the trip and must hold rating is reduced by approximately 10%.																									
Body	Blue colour																									
Actuator	Several colours “I O” and/or “On-off” legends																									
Int. circuit configuration	Series trip, shunt trip, relay trip & switch only																									
Weight (typical)	<table><tr><td>1-pole without aux. contact</td><td>101 g</td></tr><tr><td>2-pole without aux. contact</td><td>202 g</td></tr><tr><td>3-pole without aux. contact</td><td>303 g</td></tr><tr><td>4-pole without aux. contact</td><td>404 g</td></tr><tr><td>5-pole without aux. contact</td><td>505 g</td></tr><tr><td>6-pole without aux. contact</td><td>606 g</td></tr><tr><td>1-pole with aux. contact</td><td>104 g</td></tr><tr><td>2-pole with aux. contact</td><td>205 g</td></tr><tr><td>3-pole with aux. contact</td><td>306 g</td></tr><tr><td>4-pole with aux. contact</td><td>407 g</td></tr><tr><td>5-pole with aux. contact</td><td>508 g</td></tr><tr><td>6-pole with aux. contact</td><td>609 g</td></tr></table>		1-pole without aux. contact	101 g	2-pole without aux. contact	202 g	3-pole without aux. contact	303 g	4-pole without aux. contact	404 g	5-pole without aux. contact	505 g	6-pole without aux. contact	606 g	1-pole with aux. contact	104 g	2-pole with aux. contact	205 g	3-pole with aux. contact	306 g	4-pole with aux. contact	407 g	5-pole with aux. contact	508 g	6-pole with aux. contact	609 g
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5-pole with aux. contact	508 g																									
6-pole with aux. contact	609 g																									
Width per pole	19.2 mm																									
Material	Half shell - BMC 605 Handle - Valox 420SEO UL94V0 Terminals - Brass with acid tin plate																									

Circuit breaker

CR

Mechanical characteristics

Endurance	20.000 ON-OFF operations @ 6 per minute without current & voltage. 10.000 ON-OFF operations with rated current & voltage.
Trip free mechanism	Trips on short-circuit or on overload, even when actuator is forcibly held in the ON position.
Trip indication: Standard (no mid-trip)	When manually moving the operating handle from OFF to ON position, an auxiliary switch is actuated. When an overload or a short circuit causes the circuit breaker to trip, the operating handle moves positively to the OFF position and the auxiliary switch is actuated.
Mid-trip	When manually moving the operating handle from OFF to ON position, an auxiliary switch is actuated. When an overload or a short circuit causes the circuit breaker to trip, the operating handle moves positively to the mid position and the auxiliary switch is actuated.
Mid-trip with alarm switch	When manually moving the operating handle from OFF to ON position, an auxiliary switch is not actuated. When an overload or a short circuit causes the circuit breaker to trip, the operating handle moves positively to the mid position and the auxiliary switch is actuated. In this case the auxiliary switch is only actuated by an electrical trip, not by manually operating the handle. Remark: It is possible to manually switch the circuit breaker to the mid-trip position when the handle is switched from OFF to ON position quickly and with strong upwards force. Normally this won't occur in standard use. This is a normal phenomenon related to the design of the product.

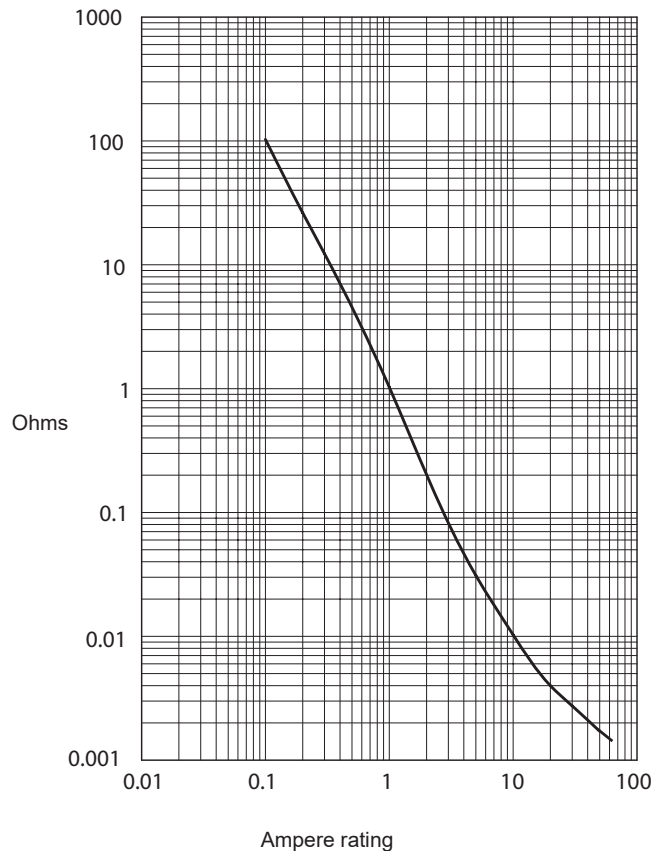
Environmental characteristics

Environmental	Complies to EN 50125-1 and IEC 60077-1
Operating temperature	-50 °C...+85 °C
Vibration	IEC 61373, Category 1, class B body mounted
Shock	IEC 61373, Category 1, class A & B body mounted
Thermal shock	Complies to MIL-107D method, test condition A
Salt mist	Complies to IEC 60068-2-52 severity level 3
Damp heat	Complies to IEC 60068-2-30 test method Db variant 1
Fire & smoke	Complies to NF F 16101, NF F 16102, EN 45545-2:HL3 for requirements R22, R23, R26
Protection	IEC 60529, IP40 when a panel is mounted over the circuit breaker; when no panel is mounted IP20
Moisture resistance / humidity	Complies to MIL-STD 202G method

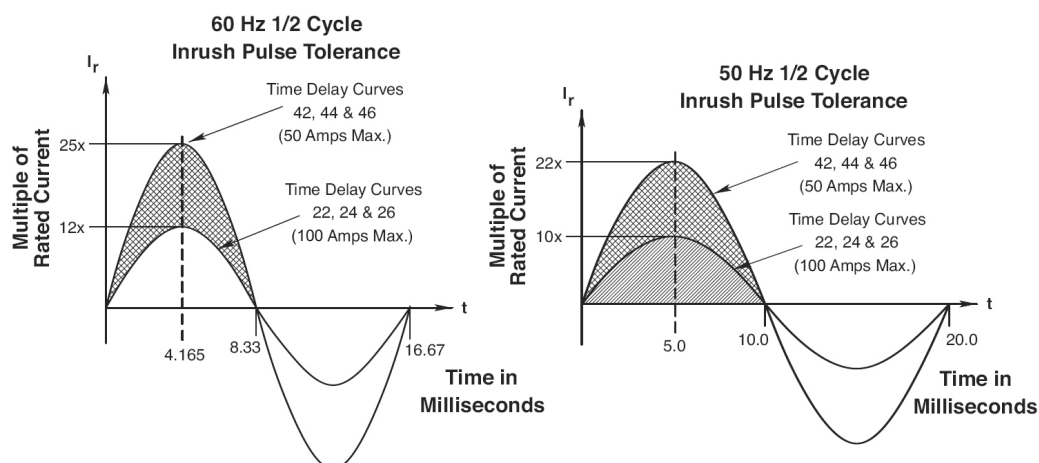
Circuit breaker CR

Resistance, impedance

Resistance, impedance values from Line to Load terminals
 (Values based on series trip circuit breaker)



Inrush pulse tolerance



Circuit breaker

CR

Table of time delay values

	DELAY	PERCENT OF RATED CURRENT									
		100%	125%	135%	150%	200%	400%	600%	800%	1000%	1200%
TRIP TIME (SECONDS)	10	No Trip	May Trip	---	.032 MAX	.024 MAX	.020 MAX	.018 MAX	.016 MAX	.015 MAX	.013 MAX
	11	No Trip	.013 - .125	---	.010 - .070	.008 - .032	.006 - .020	.005 - .020	.004 - .020	.004 - .020	.004 - .020
	12	No Trip	.500 - 6.50	---	.300 - 3.00	.130 - 1.20	.031 - .220	.011 - .120	.004 - .090	.004 - .060	.004 - .040
	14	No Trip	2.00 - 60.0	---	1.20 - 40.0	.600 - 20.0	.150 - 3.00	.030 - 1.30	.004 - .600	.004 - .100	.004 - .100
	16	No Trip	45.0 - 345	---	20.0 - 150	9.00 - 60.0	1.40 - 11.4	.150 - 5.80	.009 - 3.70	.005 - 1.70	.005 - .500
	20	No Trip	May Trip	---	.040 MAX	.035 MAX	.030 MAX	.025 MAX	.020 MAX	.017 MAX	.015 MAX
	21	No Trip	.014 - .150	---	.011 - .095	.008 - .055	.006 - .035	.005 - .027	.005 - .021	.004 - .018	.004 - .017
	22	No Trip	.700 - 12.0	---	.350 - 4.00	.130 - 1.30	.027 - .220	.008 - .130	.004 - .090	.004 - .045	.004 - .040
	24	No Trip	10.0 - 160	---	6.00 - 60.0	2.20 - 20.0	.300 - 3.00	.050 - 1.30	.007 - .500	.005 - .060	.005 - .040
	26	No Trip	50.0 - 700	---	32.0 - 350	10.0 - 90.0	1.50 - 15.0	.500 - 7.00	.020 - 3.00	.006 - 2.00	.005 - 1.00
	42	No Trip	.700 - 12.0	---	.400 - 6.00	.180 - 2.30	.050 - .600	.026 - .300	.018 - .200	.014 - .150	.012 - .130
	44	No Trip	7.00 - 100	---	3.00 - 50.0	1.10 - 18.0	.220 - 3.00	.120 - 1.70	.075 - 1.20	.050 - .850	.042 - .720
	46	No Trip	50.0 - 700	---	31.0 - 350	12.0 - 150	1.50 - 20.0	.700 - 10.0	.404 - 7.90	.260 - 6.50	.198 - 5.80
	52	No Trip	.500 - 6.50	---	.340 - 4.50	.180 - 2.30	.051 - .600	.030 - .320	.018 - .220	.014 - .200	.012 - .130
	54	No Trip	1.50 - 50.0	---	.750 - 35.0	.350 - 18.0	.110 - 3.00	.070 - 1.70	.045 - 1.40	.039 - 1.30	.035 - 1.30
	56	No Trip	45.0 - 345	---	19.0 - 170	8.50 - 100	1.24 - 15.0	.410 - 9.00	.256 - 8.00	.210 - 5.50	.198 - 2.90

Notes:

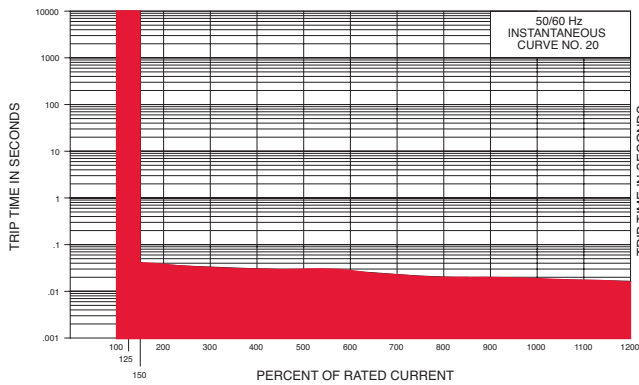
- Delay curves 11, 12, 14, 16, 21, 22, 24, 26, 42, 44, 46, 52, 54, 56: Breakers to hold 100% and must trip at 125% of rated current and greater within the time limit shown in this curve
- Delay curves 10, 20: Breakers to hold 100% and must trip at 150% of rated current and greater within the time limit shown in this curve
- All curves: Curve data shown represents breaker response at ambient temperature of 25 °C (77 °F) with no preloading. Breakers are mounted in standard wall-mount position. Delay times may vary at different temperature, the trip current rating remains unchanged
- On 50 amp and less current ratings, the minimum inrush pulse tolerance handling capability is 12 times the rated current on standard delays and 25 times the rated current on high inrush delays. These values are based on a 60 Hz 1/2 cycle, 8.33 ms pulse. High inrush delays should be specified for applications with high initial surge currents of short duration such as switching power supplies, highly capacitive loads and transformer loads

Circuit breaker CR

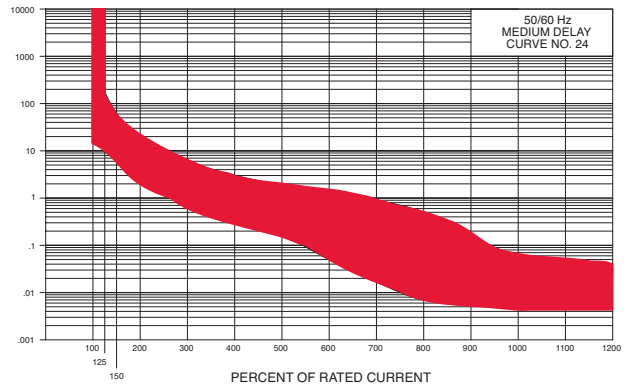
Time delay values

AC

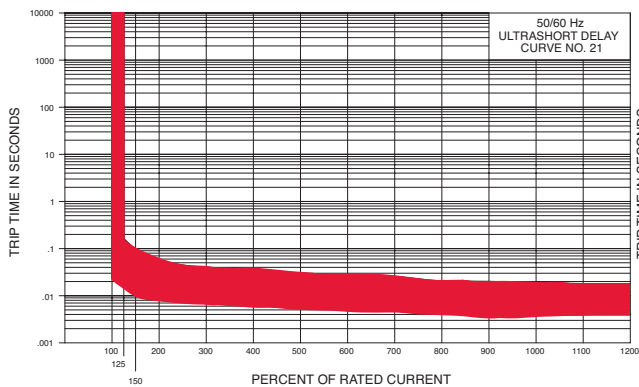
Instantaneous



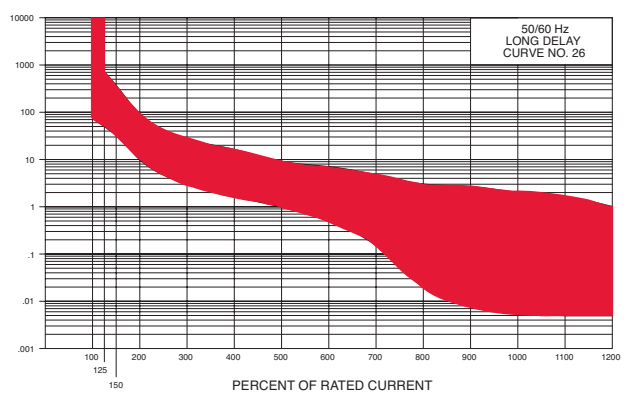
Medium



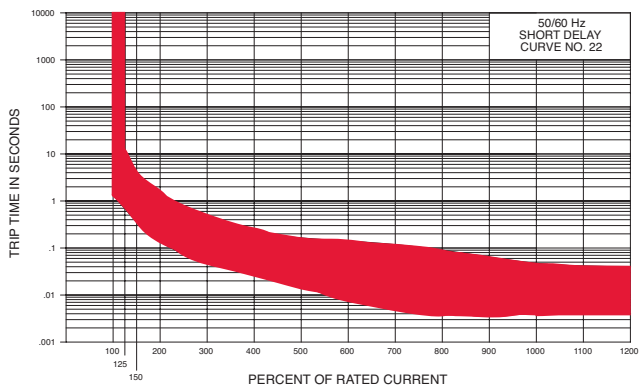
Ultrasort



Long



Short

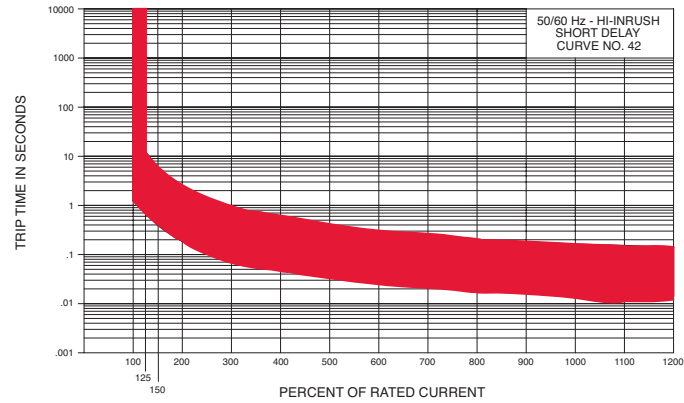


Circuit breaker CR

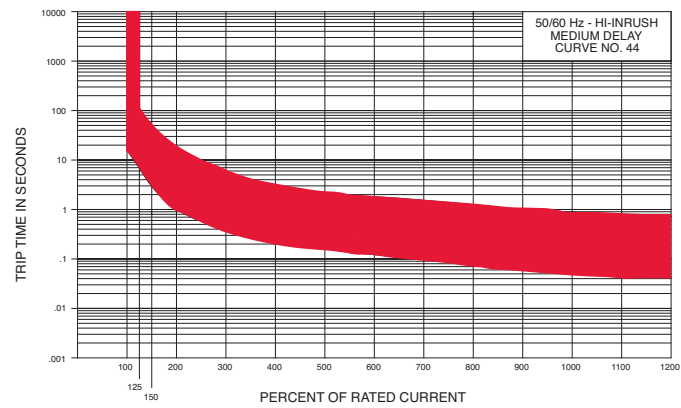
Time delay values

High Inrush AC

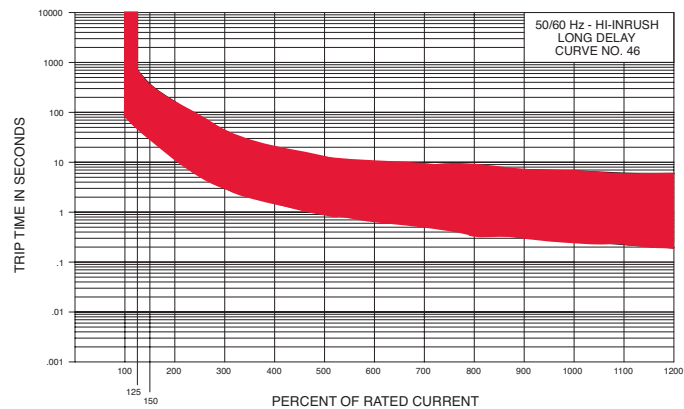
Short



Medium



Long

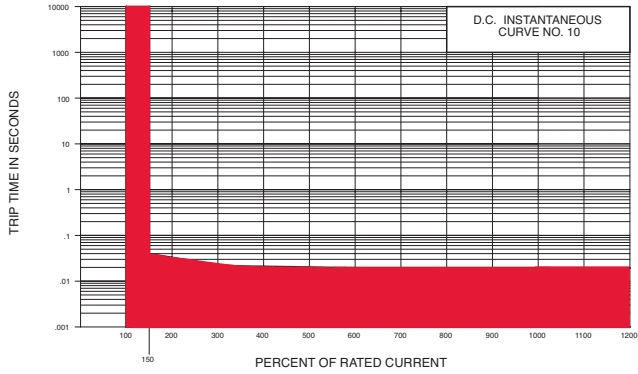


Circuit breaker CR

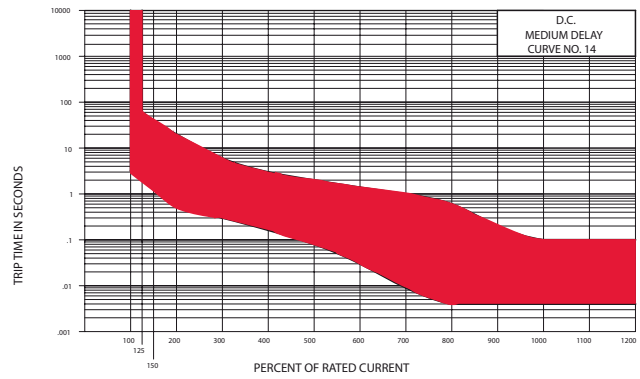
Time delay values

DC

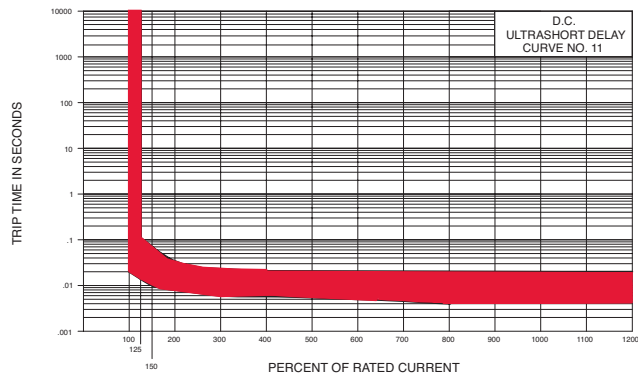
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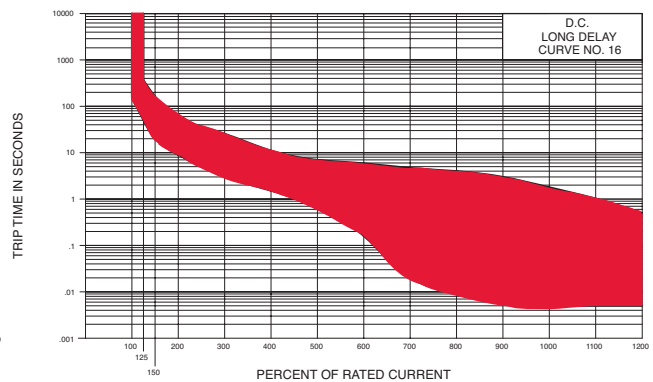
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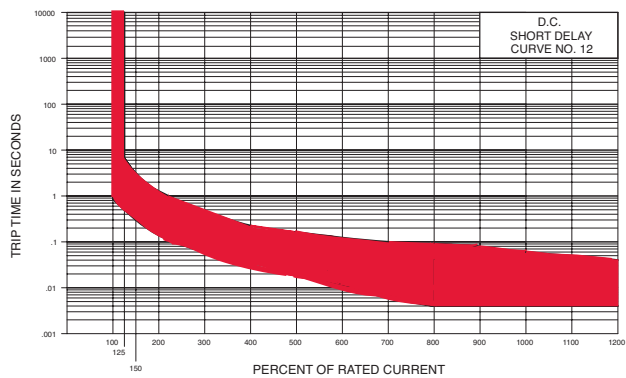
Ultrashort



Long



Short

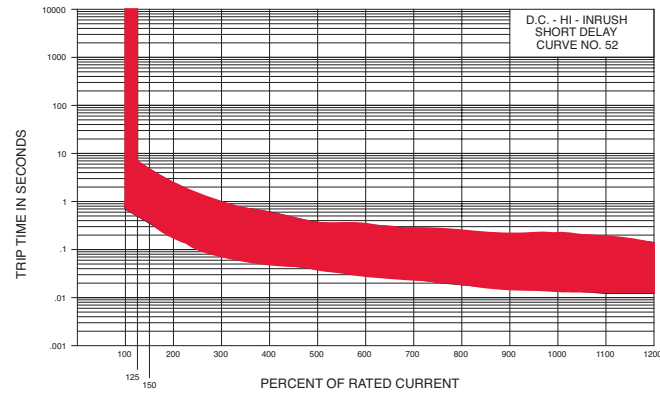


Circuit breaker CR

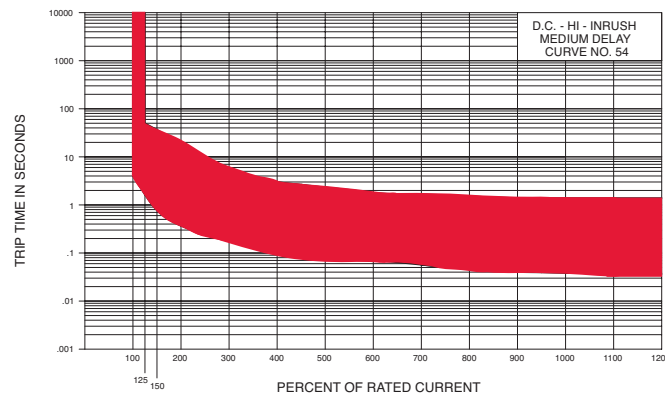
Time delay values

High Inrush DC

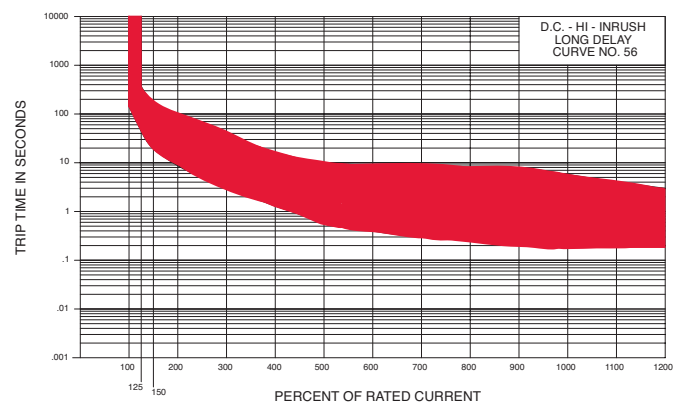
Short



Medium

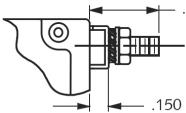
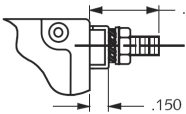
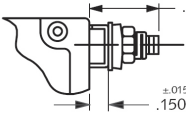
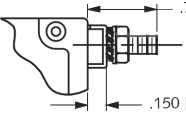
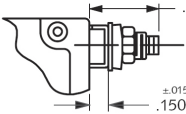
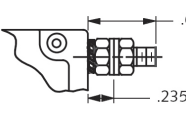
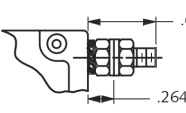
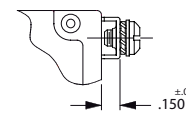
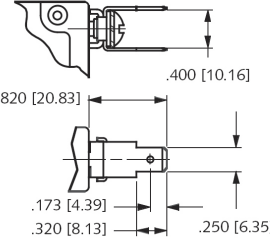


Long



Circuit breaker CR

Circuit & terminal diagrams

TERMINAL				RATING (AMPS)		
DESCRIPTION	CODE	DIMENSIONAL DETAIL		25	50	100
#10-32 STUD	1	 .723 [18.36] .150 [3.81]				
M5 STUD	4	 .688 [17.48] .150 [3.81]				
M5 STUD	R	 .688 [17.48] ±.015 ±.38 .150 [3.810]				
#1/4-20 STUD	3	 .723 [18.36] .150 [3.81]				
M6 STUD	6					
M6 STUD	5	 .723 [18.36] ±.015 ±.38 .150 [3.810]				
#1/4-20 STUD	3	 .675 [17.15] .235 [5.97]				
M6 STUD	6	 .669 [16.99] .264 [6.71]				
#10-32 SCREW	2	 ±.015 ±.38 .150 [3.810]				
M-5 SCREW	5					
.250 DOUBLE Q.C.	7	 .820 [20.83] .400 [10.16] .173 [4.39] .320 [8.13] .250 [6.35]				

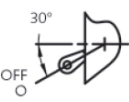
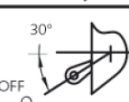
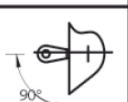
Notes:

1. All dimensions are in inches [millimeters]
2. Tolerance on stud length ± .031 [.79] unless otherwise specified

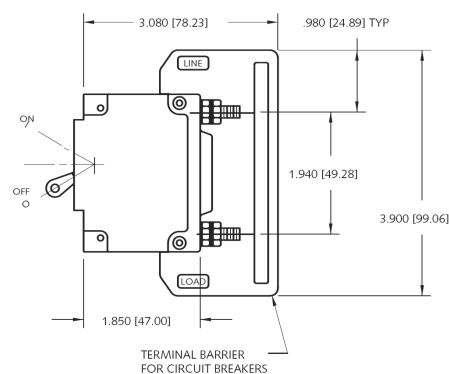
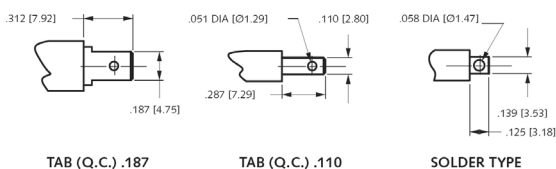
Circuit breaker CR

Circuit & terminal diagrams

Terminal hardware			
Description	Code	Ampere rating	Hardware supplied
#10-32 stud	1	.02 - 50	Flat washer - Lockwasher - Nut
M5 stud	4 & T	.02 - 50	Flat washer - Lockwasher - Nut
#1/4 - 20 stud	3	.02 - 80	Flat washer - Lockwasher - Nut
		81 - 100	Lockwasher - Nut - (2) Flat washer - Lockwasher - Nut
M6 stud	6 & V	.02 - 80	Flat washer - Lockwasher - Nut
		81 - 100	Lockwasher - Nut - (2) Flat washer - Lockwasher - Nut
#10-32 / M5	2 & 5	.02 - 50	Flat washer - Lockwasher - Screw
M5 stud	R	.02 - 50	SS flat washer per NFR 25 514 - Trepp or CS NFE 25 511 springwasher - self-locking nut per NFE 25 411
M6 stud	S	.02 - 80	SS flat washer per NFR 25 514 - Trepp or CS NFE 25 511 springwasher - self-locking nut per NFE 25 411

HANDLE POSITION VS. AUX/ALARM SWITCH MODE						
CIRCUIT BREAKER MODE	STANDARD C/B		MID TRIP C/B		MID TRIP C/B + ALARM SWITCH MODE	
	HANDLE POSITION	AUX. SWITCH MODE	HANDLE POSITION	AUX. SWITCH MODE	HANDLE POSITION	AUX. SWITCH MODE
OFF						
ON						
ELECTRICAL TRIP						

AUXILIARY / ALARM SWITCH TERMINAL DETAIL

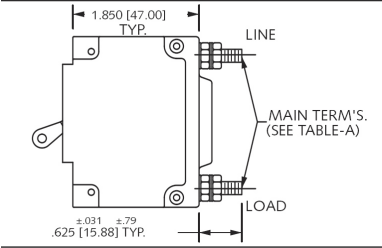
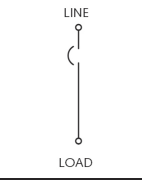
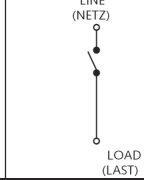
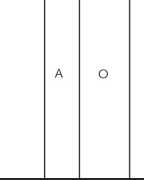
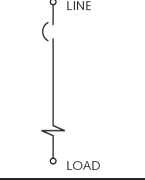
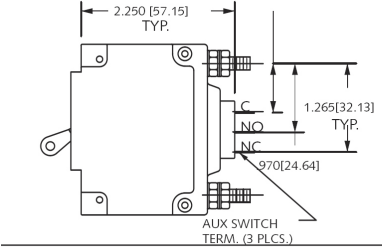
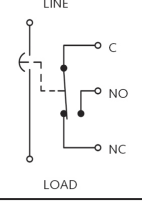
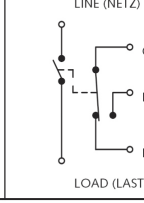
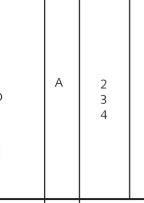
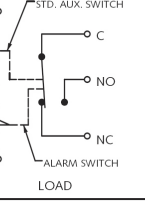
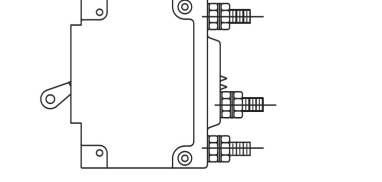
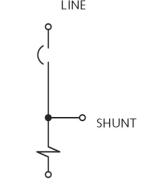
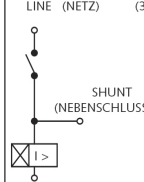
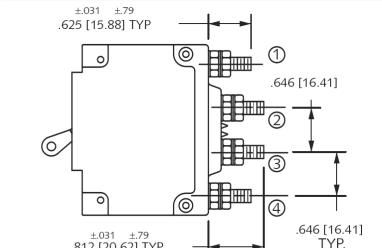
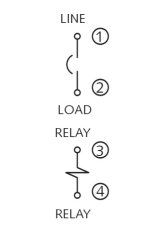
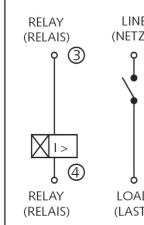


- Notes:
1. All dimensions are in inches [millimeters]
 2. Tolerance $\pm .020$ [.51] unless otherwise specified
 3. Available on Series Trip and Switch Only Circuits when called for on multi-pole units.
Only one aux. switch is normally supplied as viewed in multi-pole identification scheme.

Circuit breaker

CR

Form & fit drawings

	CIRCUIT SCHEMATIC		CIRCUIT CODE	AUX SWITCH CODE	CIRCUIT SCHEMATIC		CIRCUIT CODE	AUX SWITCH CODE
	ANSI	IEC			ANSI	IEC		
	SERIES TRIP							
	SWITCH ONLY (NO COIL)		A	O	SERIES TRIP		B C	O
								
	SWITCH ONLY (NO COIL) WITH AUXILIARY SWITCH		A	2 3 4	SERIES TRIP WITH AUXILIARY / ALARM SWITCH		B C	2 3 4
								
	SHUNT TRIP		D E					
								
	RELAY TRIP		F G					
								

Notes:

1. All dimensions are in inches [millimeters]

2. Tolerance ± 0.15 [0.38] unless otherwise specified

3. Schematic shown represents current trip circuits

TABLE A	
TIGHTENING TORQUE SPECIFICATIONS	
THREAD SIZE	TORQUE
#6-32 [M3] MOUNTING INSERTS	0.8 - 1.0 Nm
#10-32 & M5 THD STUDS	1.7 - 2.3 Nm
#10-32 THD SCREW	1.7 - 2.3 Nm
#1/4-20 & M6 THD STUDS	3.4 - 4.0 Nm

TABLE A

TIGHTENING TORQUE SPECIFICATIONS

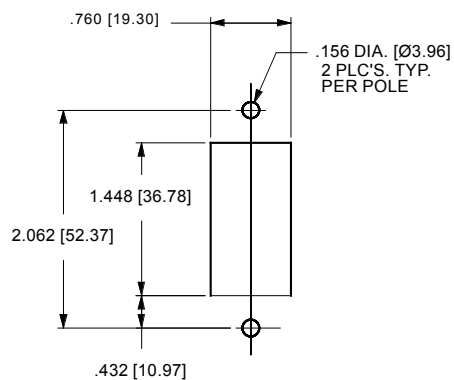
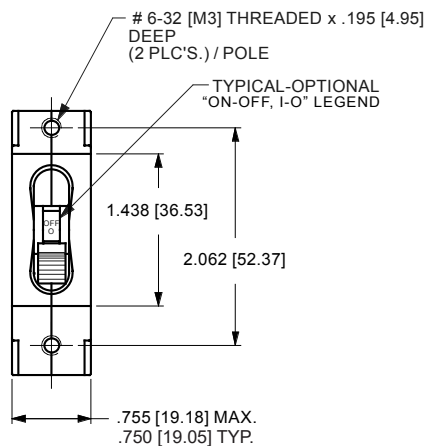
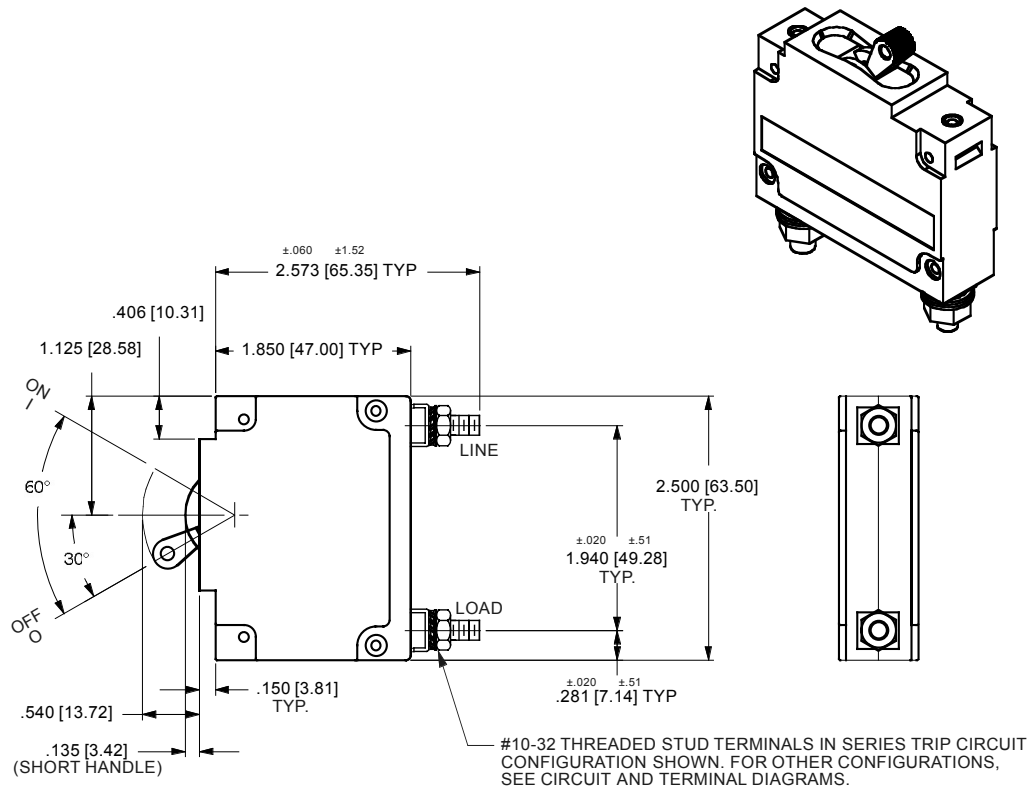
THREAD SIZE	TORQUE
#6-32 [M3] MOUNTING INSERTS	0.8 - 1.0 Nm
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- Notes:
1. All dimensions are in inches [millimeters]
 2. Tolerance ± 0.15 [0.38] unless otherwise specified
 3. Schematic shown represents current trip circuits

Circuit breaker CR

Form & fit drawings

1 pole configuration



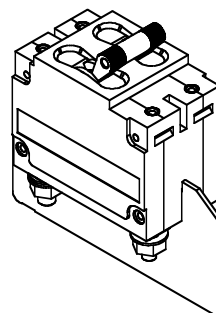
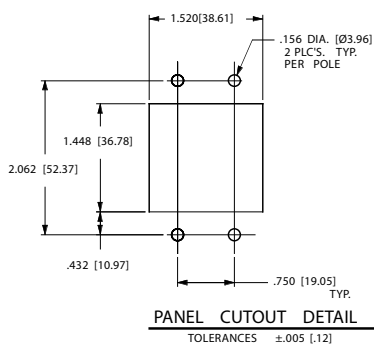
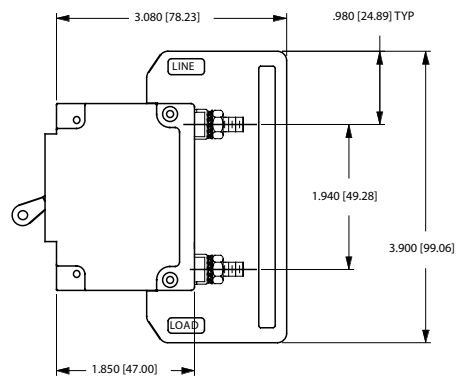
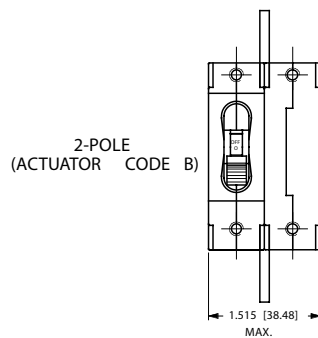
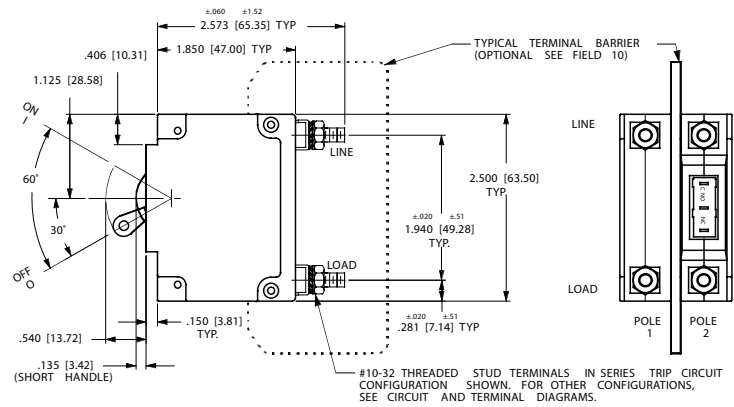
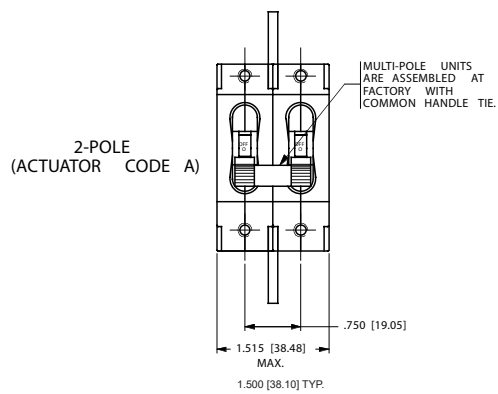
PANEL CUTOUT DETAIL
TOLERANCES ± 0.005 [.12]

- Notes:
1. All dimensions are in inches [millimeters]
 2. Tolerance ± 0.10 [0.25] unless otherwise specified

Circuit breaker
CR

Form & fit drawings

2 pole configuration

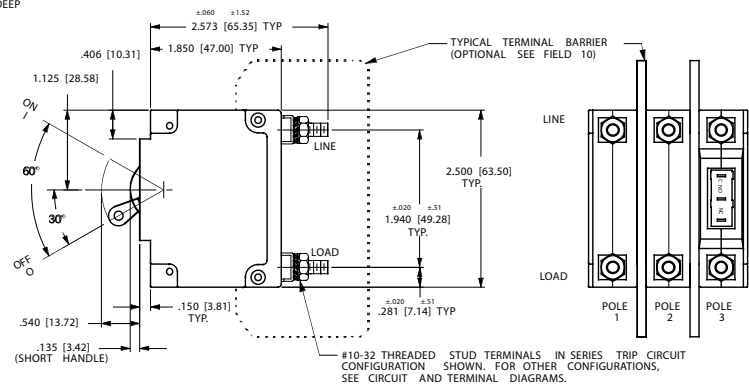
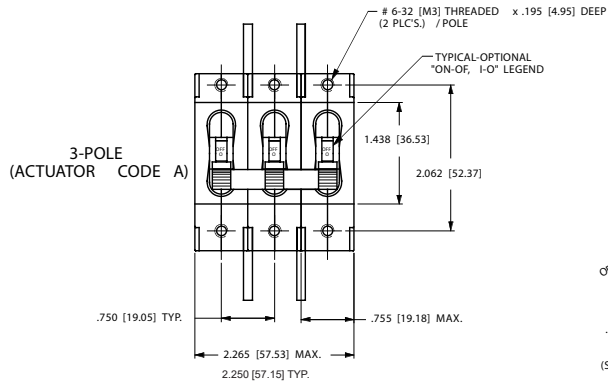


- Notes: 1. All dimensions are in inches [millimeters]
2. Tolerance ± 0.10 [0.25] unless otherwise specified

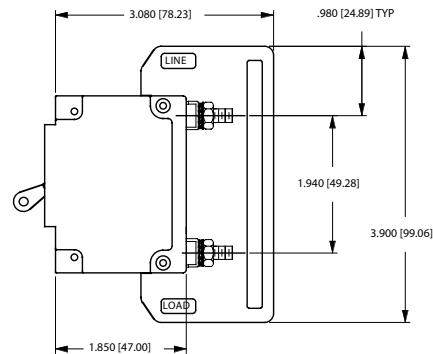
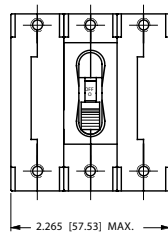
Circuit breaker CR

Form & fit drawings

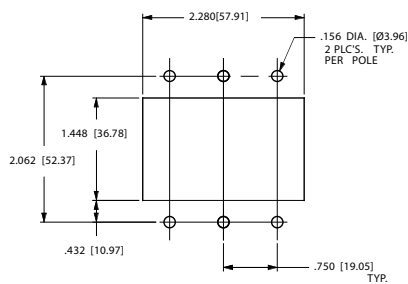
3 pole configuration



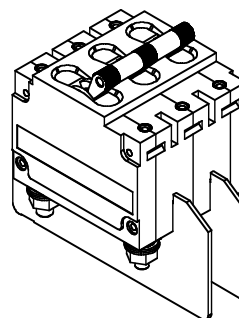
3-POLE (ACTUATOR CODE B)



BARRIER FOR MULTI-POLE BREAKERS
Barrier with other dimensions on request



PANEL CUTOUT DETAIL
TOLERANCES ±.005 [0.12]

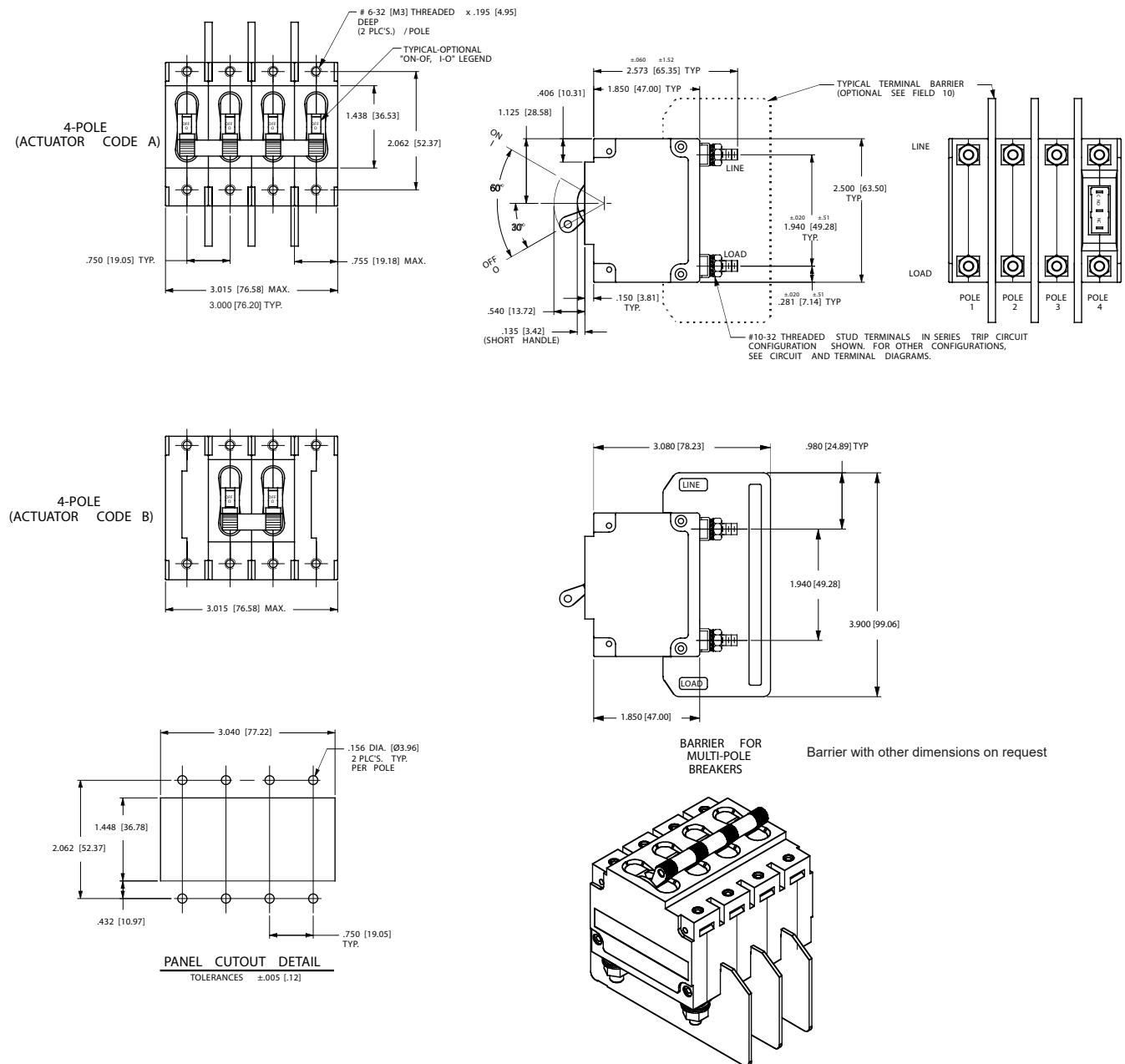


- Notes:
1. All dimensions are in inches [millimeters]
 2. Tolerance ± 0.10 [0.25] unless otherwise specified

Circuit breaker CR

Form & fit drawings

4 pole configuration

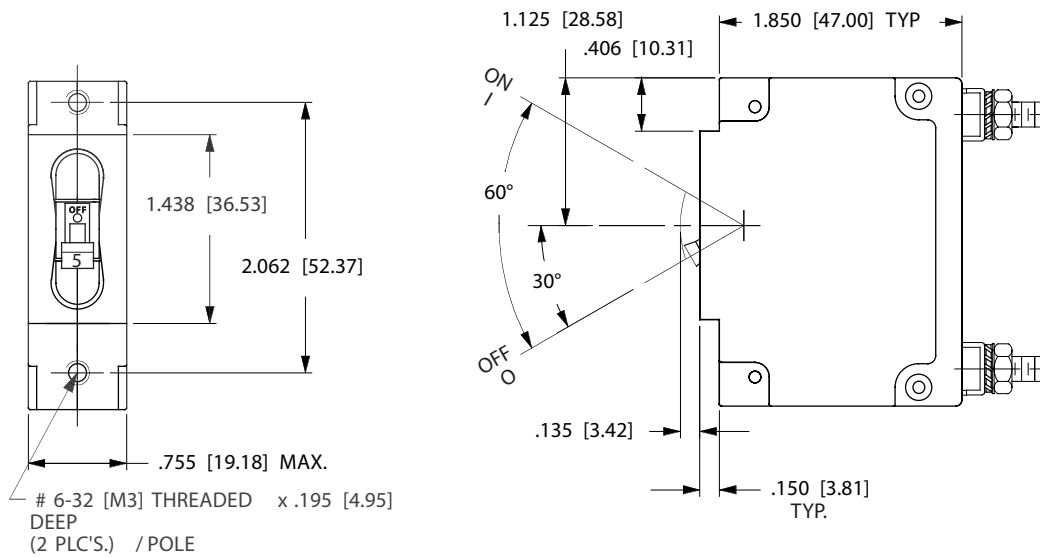


- Notes:
1. All dimensions are in inches [millimeters]
 2. Tolerance ± 0.10 [0.25] unless otherwise specified

Circuit breaker CR

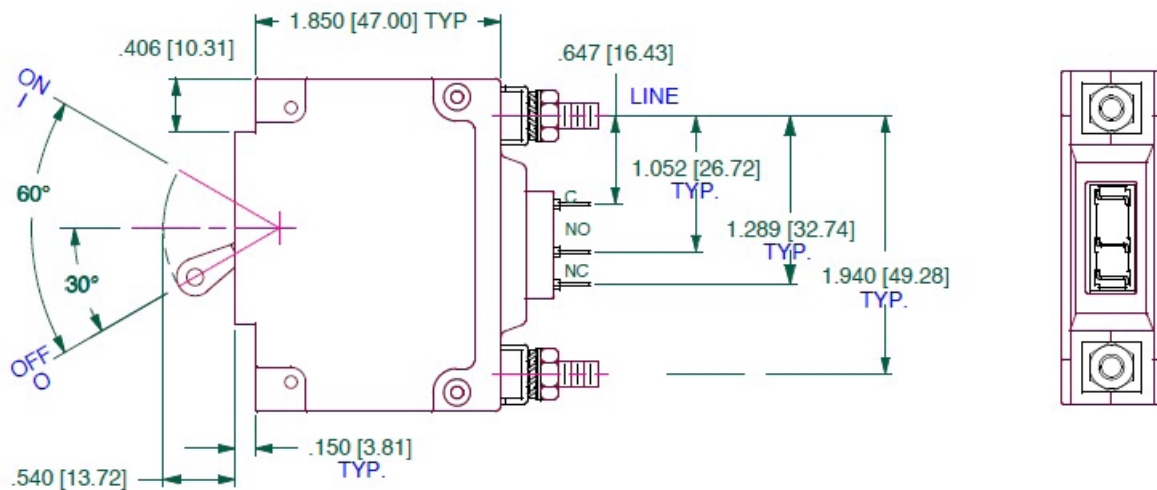
Form & fit drawings

Short handle option



Rocker style actuator on request.

Auxiliary switch, 0.187 terminal

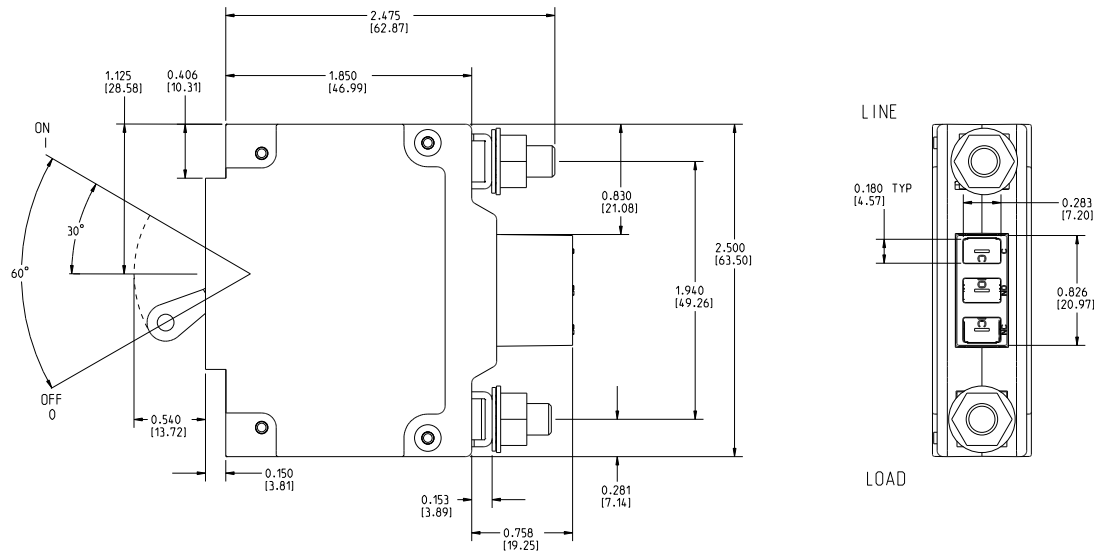


- Notes:
1. All dimensions are in inches [millimeters]
 2. Tolerance ± 0.10 [0.25] unless otherwise specified

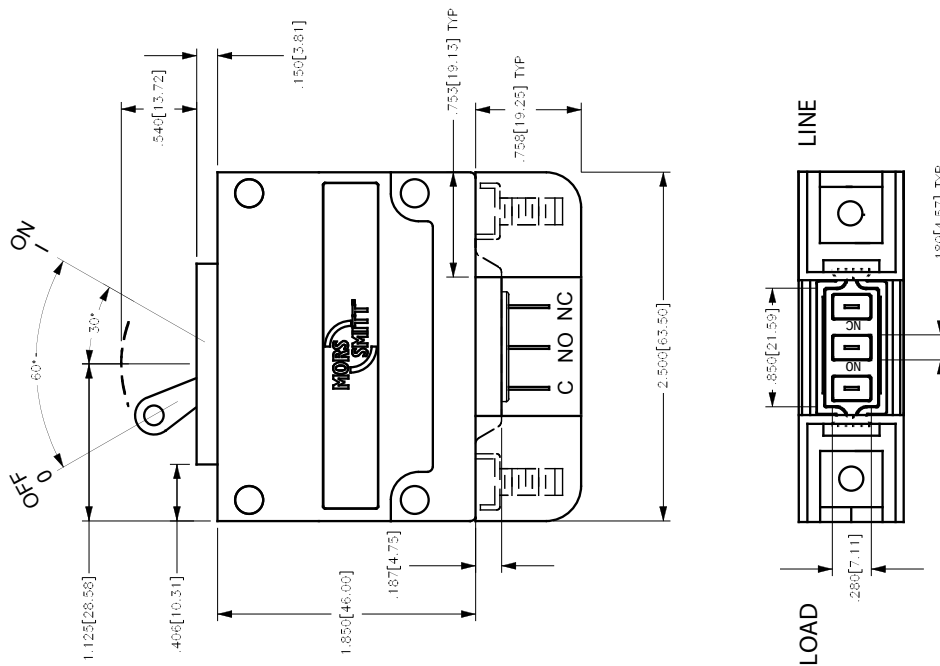
Circuit breaker CR

Form & fit drawings

Auxiliary switch cover without shrouds



Auxiliary switch cover and shrouds on terminals option



- Notes:
1. All dimensions are in inches [millimeters]
 2. Tolerance ± 0.10 [0.25] unless otherwise specified

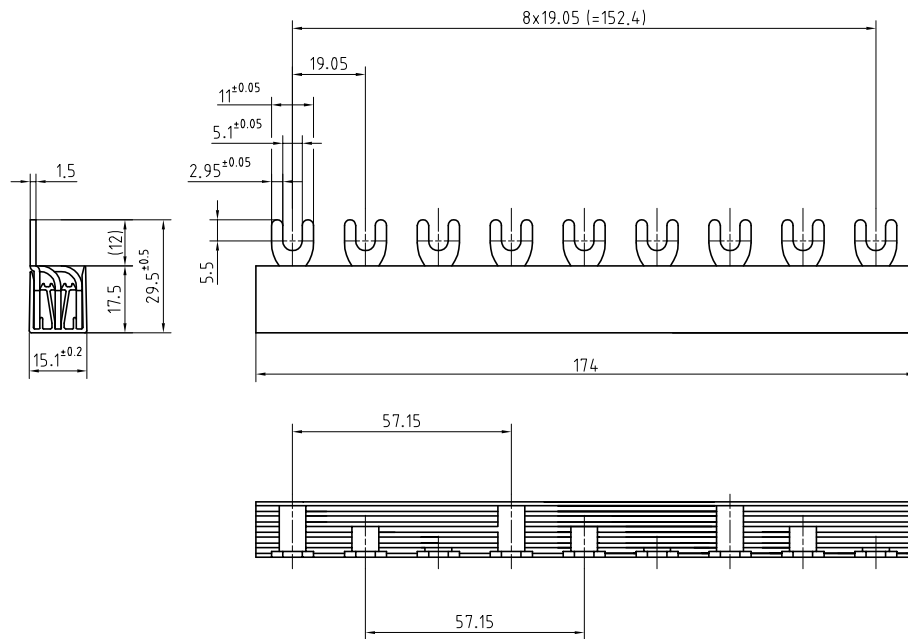
Circuit breaker CR

Form & fit drawings

Busbar connection

To connect terminals of different CR-circuit breakers, busbars are available in different configurations. Contact Mors Smitt for more information.

Example: 3-phase busbar with 9 poles:



Notes: 1. All dimensions are in millimeters

Circuit breaker

CR

Ordering scheme CR - page 1

CR		- -		codes continue on following page.....	
Poles ¹	1			1 pole	
	2			2 poles	
	3			3 poles	
	4			4 poles	
	5			5 poles	
	6			6 poles	
Current rating (amperes) ²	020		0.020	420	2.000
	025		0.025	522	2.250
	030		0.030	425	2.500
	035		0.035	527	2.750
	040		0.040	430	3.000
	045		0.045	435	3.500
	050		0.050	440	4.000
	055		0.055	445	4.500
	060		0.060	450	5.000
	065		0.065	455	5.500
	070		0.070	460	6.000
	075		0.075	465	6.500
	080		0.080	470	7.000
	085		0.085	475	7.500
	090		0.090	480	8.000
	095		0.095	485	8.500
	210		0.100	490	9.000
	215		0.150	495	9.500
	220		0.200	610	10.000
	225		0.250	710	10.500
	230		0.300	611	11.000
	235		0.350	711	11.500
	240		0.400	612	12.000
	245		0.450	712	12.500
	250		0.500	613	13.000
	255		0.550	614	14.000
	260		0.600	615	15.000
	265		0.650	616	16.000
	270		0.700	617	17.000
	275		0.750	618	18.000
	280		0.800	620	20.000
	285		0.850	622	22.000
	290		0.900	624	24.000
	295		0.950	625	25.000
	410		1.000	630	30.000
	512		1.250	632	32.000
	415		1.500	635	35.000
	517		1.750	640	40.000
(Over values on request)					
Frequency & delay	03 ⁴		DC, 50/60 Hz, switch only		
	10		DC instantaneous		
	11		DC ultra short		
	12		DC short		
	14		DC medium		
	16		DC long		
	20		50/60 Hz instantaneous		
	22		50/60 Hz short		
	24		50/60 Hz medium		
	26		50/60 Hz long		
	42 ⁵		50/60 Hz short, hi-inrush		
	44 ⁵		50/60 Hz medium, hi-inrush		
	46 ⁵		50/60 Hz long, hi-inrush		
	52 ⁵		DC, short, hi-inrush		
	54 ⁵		DC, medium, hi-inrush		
	56 ⁵		DC, long, hi-inrush		

	-	-	-	-	-	-	-																																																				
Circuit	A ⁴								Switch only (no coil)																																																		
	B								Series trip (current)																																																		
	C								Series trip (voltage)																																																		
	D ⁶								Shunt trip (current)																																																		
	E ^{6,18}								Shunt trip (voltage)																																																		
	F ^{6,18}								Relay trip (current)																																																		
	G ^{6,18}								Relay trip (voltage)																																																		
Actuator ⁷	A								Handle, one per pole																																																		
	B								Handle, one per multiple unit																																																		
	S								Mid-trip handle, one per pole																																																		
	T								Mid-trip handle, one per pole & alarm switch																																																		
Actuator colour & legend	..								<table><tr><th>Actuator colour</th><th>I-O</th><th>On-Off</th><th>Dual</th><th>Legend colour</th></tr><tr><td>White</td><td>A</td><td>B</td><td>1</td><td>Black</td></tr><tr><td>Black</td><td>C</td><td>D</td><td>2</td><td>White</td></tr><tr><td>Red</td><td>F</td><td>G</td><td>3</td><td>White</td></tr><tr><td>Green</td><td>H</td><td>J</td><td>4</td><td>White</td></tr><tr><td>Blue</td><td>K</td><td>L</td><td>5</td><td>White</td></tr><tr><td>Yellow</td><td>M</td><td>N</td><td>6</td><td>Black</td></tr><tr><td>Grey</td><td>P</td><td>Q</td><td>7</td><td>Black</td></tr><tr><td>Orange</td><td>R</td><td>S</td><td>8</td><td>Black</td></tr><tr><td>White (short handle)¹⁸</td><td>V</td><td>W</td><td>0</td><td>Black</td></tr></table>	Actuator colour	I-O	On-Off	Dual	Legend colour	White	A	B	1	Black	Black	C	D	2	White	Red	F	G	3	White	Green	H	J	4	White	Blue	K	L	5	White	Yellow	M	N	6	Black	Grey	P	Q	7	Black	Orange	R	S	8	Black	White (short handle) ¹⁸	V	W	0	Black
Actuator colour	I-O	On-Off	Dual	Legend colour																																																							
White	A	B	1	Black																																																							
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Grey	P	Q	7	Black																																																							
Orange	R	S	8	Black																																																							
White (short handle) ¹⁸	V	W	0	Black																																																							
Auxiliary switch ⁹		0							Without auxiliary switch																																																		
		2							SPDT, 0.110 QC term.																																																		
		3							SPDT, 0.139 solder lug																																																		
		4							SPDT, 0.110 QC term. (gold contacts)																																																		
		9							SPDT, 0.187 QC term.																																																		
		A							SPDT, 0.110 QC term. with cover																																																		
		B							SPDT, 0.110 QC term. (gold contacts) with cover																																																		
Terminal		1 ⁹							Stud 10-32, threaded																																																		
		2 ¹⁰							Screw 10-32 with saddle & washer clamps																																																		
		3 ¹¹							Stud 1/4-20, threaded																																																		
		4 ¹⁰							Stud M5 x 0.8, threaded																																																		
		R ¹⁰							Stud M5 x 0.8, threaded with NFF washers and lockable nut																																																		
		T ¹⁰							Stud M5 x 0.8, threaded with shrouds																																																		
		U ¹⁰							Stud M5 x 0.8, threaded with NFF washers and lockable nut, with shrouds																																																		
		5 ¹⁰							Screw M5 x 0.8 with saddle & washer clamp																																																		
		6 ¹¹							Stud M6 threaded																																																		
		S ¹¹							Stud M6 threaded with NFF washers and lockable nut																																																		
		V ¹¹							Stud M6 threaded with shrouds																																																		
		W ¹¹							Stud M6 threaded with NFF washers and lockable nut, with shrouds																																																		
		7 ¹²							Double quick terminal connection																																																		
Mounting & barriers									<table><tr><th>Mounting style</th><th>Barriers</th></tr><tr><td>Threaded insert</td><td></td></tr><tr><td>1¹⁹</td><td>Yes, between poles only (multi pole)</td></tr><tr><td>A¹⁹</td><td>Yes, between poles and at right side viewed from back (multi pole)</td></tr><tr><td>6¹⁹</td><td>Yes, barrier at right side viewed from back (single pole)</td></tr><tr><td>5</td><td>No</td></tr><tr><td>2¹⁹</td><td>Yes, between poles only (multi pole)</td></tr><tr><td>F¹⁹</td><td>Yes, between poles and at right side viewed from back (multi pole)</td></tr><tr><td>7¹⁹</td><td>Yes, barrier at right side viewed from back (single pole)</td></tr><tr><td>4</td><td>No</td></tr></table>	Mounting style	Barriers	Threaded insert		1 ¹⁹	Yes, between poles only (multi pole)	A ¹⁹	Yes, between poles and at right side viewed from back (multi pole)	6 ¹⁹	Yes, barrier at right side viewed from back (single pole)	5	No	2 ¹⁹	Yes, between poles only (multi pole)	F ¹⁹	Yes, between poles and at right side viewed from back (multi pole)	7 ¹⁹	Yes, barrier at right side viewed from back (single pole)	4	No																														
Mounting style	Barriers																																																										
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7 ¹⁹	Yes, barrier at right side viewed from back (single pole)																																																										
4	No																																																										
Maximum application rating						B			125 VDC																																																		
						C ¹³			120/240 VAC																																																		
						D ¹⁴			240 VAC																																																		
						J ¹⁵			415 VAC																																																		
Agency approval						2			TUV certified, UL recognized ¹⁷																																																		
						1			UL listed only																																																		
						A			No agency approvals (configuration not tested by external agency)																																																		



Circuit breaker

CR

Notes:

1. Standard multipole units have all poles identical except when specifying auxiliary switch, mixed poles on request
2. Current rating 60 A - 100 A are available with circuit codes A & B only. Current ratings 80 A - 100 A are available up to 2 poles maximum
3. Voltage coils not rated for continuous duty. Available only with delay codes 10 and 20
4. For 0.02 to 30 A, select current code 630
For 30 - 50 A, select current code 650
For 60 - 70 A, select current code 670
For 80 - 100 A, select current code 810
Maximum number of poles on request
5. Available with circuit codes B & D only, and up to 50 A maximum
6. Circuit codes D, E, F & G available with terminal codes 1,2,4 & 5 only. Circuit codes D available up to 50 A maximum current rating
7. Actuator code:
B: Handle location as viewed from front of breaker:
2 pole - left pole
3 pole - center pole
4 pole - two handles at center poles
5 pole - three handles at center poles
6 pole - four handles at center poles
S: Handle moves to mid-position only upon electrical trip of the breaker, available with all circuit codes except switch only
T: Handle moves to mid-position and alarm switch activates only upon electrical trip of the breaker, available with circuit codes B & C
8. Auxiliary switch available with series trip and switch only circuits. On multi-pole breakers, one auxiliary switch is supplied, mounted in the extreme right pole (rear view)
9. Available to 60 A maximum
10. Available to 50 A maximum
11. Available to 100 A maximum
12. Available to 25 A maximum
13. 2 & 3 pole circuit breakers required for 120/240 VAC applications, terminal barrier is required. Third pole is for 120/240 VAC applications requiring neutral disconnect. The 3rd pole has the same construction as poles 1 & 2.
14. Code only applicable for single pole. For multiple poles select code C
15. Multiple pole only
16. Single pole only
17. TUV certified: not for switch only circuit and not for actuator legend 'ON-OFF'
TUV certified: Min:1A; Max 70A
Below 1A: UL listed only and Barriers are mandatory.
Above 70A: No Agency Approval (code A)
UL recognized: for most applications, not for all
UL listed: possible on request
Special applications without approvals: agency approval code A
18. Not TUV certified, agency approval code A
19. Barriers not in combination with terminal shrouds. When barrier is placed at the side the total width will increase with approximately 1.9 mm

Circuit breaker **CR**

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