Technical Data

Allen-Bradley

Motor Protection Circuit Breaker Specifications

Bulletin Number 140-CMN

Additional Resources

These documents contain additional information concerning related products from Rockwell Automation.

Resource	Description
Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1	Provides general guidelines for installing a Rockwell Automation industrial system.
Product Certifications website, http://www.ab.com	Provides declarations of conformity, certificates, and other certification details.

You can view or download publications at http://www.rockwellautomation.com/literature/. To order paper copies of technical documentation, contact your local Allen-Bradley distributor or Rockwell Automation sales representative.

Overview

Motor Protection Circuit Breakers may provide the following protective and control functions.

- Disconnect for Motor Branch Circuit
- Branch-Circuit, Short-Circuit Protection (Magnetic Protection)
- Overload Protection (Thermal Protection)
- Switching (Manual)

In North America, electrical codes require that an individual Motor Branch Circuit be protected by a UL/CSA Listed Fuse, Circuit Breaker or Self-Protected Combination Motor Controller.

The 140-CMN frame Motor Protection Circuit Breakers are UL Listed/CSA Certified as Manual Motor Controllers (with optional approvals for Motor Disconnect and Group Installation). In NEC/CEC Group Installations, these devices must be applied per the appropriate rules which require the use of an upstream Branch-Circuit, Short-Circuit Protective Device (BCPD). See the table on UL/CSA Listed Application Ratings - Motor Protection Circuit Breaker (MPCB) Only for the specific ratings of each Motor Protection Circuit Breaker.

Standards Compliance and Certifications

Standards Compliance	Certifications
IEC/EN60947-1,-2	CE Marked
CSA,C22.2 No.14	CSA Certified
UL508	cULus Listed (File No. E54612, NLRV(7); E205542, NKJH(7); E197878, DIVQ(7);)

	
Attribute	**140-CMN**
Max. Current I_e	90 A
Current Rating	16…90 A
Short Circuit Protection	✓
Standard Magnetic T rip	✓
High Magnetic Trip	✓
Overload Protection	✓
Trip Class	10
Application at output of VFD (multi-motor)	
Standards Compliance:	
CSA22.2, No.14	✓
UL508 (Group Installation)	✓ (see ratings)
UL508 (Overload Protection)	✓
IEC60947-1,-2	✓
CE	✓
Accessories	
External Rotary Operator	✓
Auxiliary Contacts	✓
Trip Indication Contacts	✓

IEC Performance Data

Table 1 - IEC Performance Data

Cat.No.		140-CMN…			
		-2500	-4000	-6300	-9000
Rated Operational Current, I_e	[A]	25	40	63	90
Magnetic Release Current	[A]	350	560	890	1260
Switching of Standard Three-Phase Motors, AC-3					
230/240V ‡	[kW]	5.5/7.5	10/11	13/20	22/25
400/415V ‡	[kW]	7.5/13	15/22	25/32	37/45
500V ‡	[kW]	11/15	18.5/25	30/40	45/55
690V ‡	[kW]	15/22	25/30	37/55	63/75
Back-Up Fuses gG, gL, only if $I_{cc} \geq I_{cu}$					
230/240V	[A]	⋆	⋆	⋆	⋆
400/415V	[A]	160	160	160	160
500V	[A]	160	160	160	160
690V	[A]	160	160	160	160
Ultimate Short Circuit Breaking Capacity, I_{cu}					
230/240V	[kA]	100	100	50	50
400/415V	[kA]	50	30	20	20
500V	[kA]	30	20	10	10
690V	[kA]	15	8	4	4
Rated Service Short Circuit Breaking Capacity, I_{cs}					
230/240V	[kA]	100	100	50	50
400/415V	[kA]	50	30	8	8
500V	[kA]	30	15	6	6
690V	[kA]	15	8	4	4

⋆ No back-up fuse required.

‡ Power ratings: Preferred values according to IEC 60072-1.

General Data

Table 2 - General Data

Attribute		140-CMN
Rated Insulation Voltage U_i		
IEC, SEV, VDE0660	[V]	690
UL, CSA	[V]	600
Rated Impulse Withstand Voltage U_{imp}		
Pollution degree		3
Main circuits U_{imp}/Overvoltage Category		6kV/III
Auxiliary circuits U_{imp}/Overvoltage Category		6kV/III
Rated Frequency	[Hz]	40…60
Utilization Category		

Attribute		140-CMN
IEC60947-2 (Circuit breaker)		A
IEC60947-4-1 (Motor starter)		AC-3 (except 90 A)
Lifespan		
Mechanical	[operations]	30000
Electrical (I_e max.)	[operations]	5000
Switching Frequency	[operations/h]	max.20
Ambient Temperature		
Storage	[°C]	-25…+80
Operation	[°C]	-25…+60
Climatic resistance		
Moisture change climate (600068-2-30)		23°C/83% relative humidity and 40°C/92% relative humidity, 56 cycles
Dry heat (60086-2-2)		100°C, relative humidity <50%, 7 days
Moisture heat (60068-2-3)		40°C, relative humidity 93%, 56 days
Protection Class		IP2X from front with terminal wired, (min. wire size 35 mm^2 or #4 AWG)
Resistance to Shock, Transport (60068-2-27)		30g,11 ms
Rated Thermal Current I_{th}		
up to 40°C ambient temperature	[A]	16…90
up to 60°C ambient temperature	[A]	16…90
Rated Supply Current I_e	[A]	16…90
Dependence on Temperature		
40°C	[A]	no reduction
50°C	[A]	no reduction
60°C	[A]	no reduction
70°C	[A]	15% current reduction of the upper rated current I_e
Overload Protection		
Characteristics		IEC60947
Ambient Temperature Compensation	[°C]	20…+60
Phase-loss Protection		Differential release
Trip class		10
Magnetic Release Release current(+/-20%)		fixed setting 14 x I_e max.
Total Power Loss P_v		
Circuit Breaker at rated load operating temperature	[W]	33
Main Disconnect Switch Application		Yes, with accessories
Application Conditions		For utilization outside North America, assemblies (of products) shall comply to the IEC61439-1 requirements

Table 3 - General Data, Continued

Attribute			140-CMN
Conformity to Standards			IEC60947-1;-2; EN60947-1;-2; UL508; CSA22.2, No.14
Approvals			CE,UL,CSA
Terminal Parts Type of terminals			
	1.conductor 2.conductor	[mm²]/[AWG] [mm²]/[AWG]	2.5…35
	1.conductor 2.conductor	[mm²]/[AWG] [mm²]/[AWG]	2.5…35
	1.conductor 2.conductor	[mm²]/[AWG] [mm²]/[AWG]	4…50/12…2
	1.conductor 2.conductor	[mm²]/[AWG] [mm²]/[AWG]	4…50/12…2
Tightening torque		[N•m]/[lb•in]	6…10/55…90

Weights

Description	Weight [g]	Cat.No.
Motor Protection Circuit Breakers	1845	140-CMN-…
Auxiliary Contacts	31	140-CA…
Undervoltage Trip	94	140-CUV…
Trip Contact Blocks	31	140-CT…
Shunt Trip	94	140-CRT…

Accessories for Bulletin140-CMN Circuit Breakers

Table 4 - Accessory Specifications

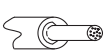
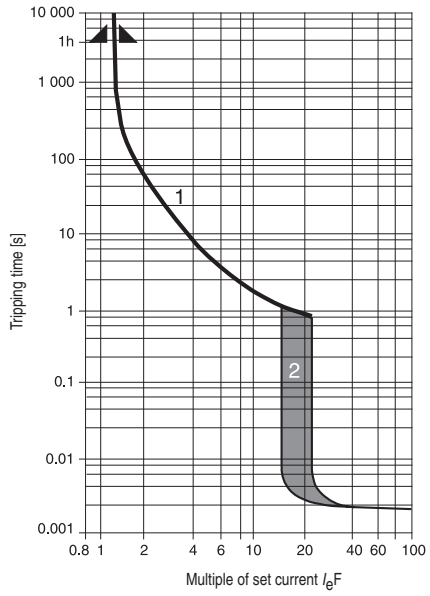
		Cat.No.140-CT Trip Contact Block for Flush Mounting on Cat.No. 140-CMN Circuit Breakers					Cat.No.140-CRT,140-CUV Undervoltage Trip and Shunt Trip for Flush Mounting on Cat.No. 140-CMN Circuit Breakers					
Rated Thermal Current I_{th} up to 40°C ambient temperature up to 60°C ambient temperature	[A] [A]	10 6					2 2					
NEMA contact class (UL/CSA-Approval)	AC DC	B600 Standard Pilot Duty R300 Light Pilot Duty					Make/Breakmax.voltage 432VA 72 VA 480V 28VA 28VA 250V					
Back-Up Fuse gG, gL		16A					16A					
Rated Current I_e												
AC-15:	[V] [A]	230 3	400 2.5	500 1.5	690 0.75		AC-14:	24 1.5	110 1.5	230 1.0	400 1.0	500 0.75
DC-13:	[V] [A]	24 2	48 0.6	110 0.2	230 0.1	440 0.04	DC13:	24 1.5	48 0.5	60 0.4	110 0.2	
Terminals												
Screwdriver												
 1.conductor 2.conductor	[mm²]/[AWG] [mm²]/[AWG]	0.75…2.5/No.18…14 0.75…2.5/No.18…14					0.75…2.5/No.18…14 0.75…2.5/No.18…14					
 1.conductor 2.conductor	[mm²]/[AWG]	0.75…2.5/No.18…14 0.75…2.5/No.18…14					0.75…2.5/No.18…14 0.75…2.5/No.18…14					
Tightening torque	[N•m]/[lb•in]	1…1.5/8.8…10.3					1…1.5/8.8…10.3					

Table 5 - Trip Unit Specifications

			Cat.No.140-CUV... Undervoltage Trip Unit for Right-Side Mounting on Cat. No. 140-CMN Circuit Breakers	Cat.No.140-CRT... Shunt Trip for Flush Mounting on Cat. No. 140-CMN Circuit Breakers
Operating Voltage	Pick-up		0.8...1.1 x U_s	0.7...1.1 x U_s
	Drop-out		0.7...0.35 x U_s	—
Duty cycle			100% ED	100% ED
Control Voltage		min.	12V, 50Hz/14V, 60Hz	12V, 50Hz/14V, 60Hz
		max.	600V, 50Hz	600V 50Hz
Coil Performance	Pick-up Drop-out	[VA/W] [VA/W]	11/8 4/1	12/7 6/2
	Fine-stranded	[mm^2]	2 x 0.75...2.5	2 x 0.75...2.5
	Coarse-stranded	[mm^2]	2 x 0.75...2.5	2 x 0.75...2.5
Tightening torque		[N•m]	1...1.5	1...1.5
	Coarse-stranded	[AWG]	No. 18....14	No. 18....12
Tightening torque		[lb•in]	8.8...10.3	8.8...10.3

Time-Current Characteristic

Figure 1 - 140-CMN Motor Protection Circuit Breaker Time-Current Characteristic



Thermal Release Trip Current

The adjustable current-dependent delayed bimetal release protects motors against overload. The curve shows the mean operating current at an ambient temperature of 20 °C starting from the cold state. Careful testing and setting ensures effective motor protection even in the case of single phasing. The overload characteristic is also valid for transformer protection.

Magnetic Release Trip Current

The instantaneous magnetic trip has a fixed operating current setting. This corresponds to 13…14 times the maximum value of setting range. (Transformer protection up to 20 x I_e max.) At a lower setting it is correspondingly higher.

Current Setting I_eF

The overload trip corresponds to a thermal overload relay in a motor starter conforming to IEC947-4-1. If a different value is prescribed (e.g., reduced I_e for cooling medium having a temperature higher than 40 °C or a place of installation higher than 2000 m above sea level), the setting current is equal to the reduced rated current I_e of the motor.

Approximate Dimensions

Dimensions are shown in millimeters (inches). Dimensions are not intended to be used for manufacturing purposes.

Figure 2 - 140-CMN

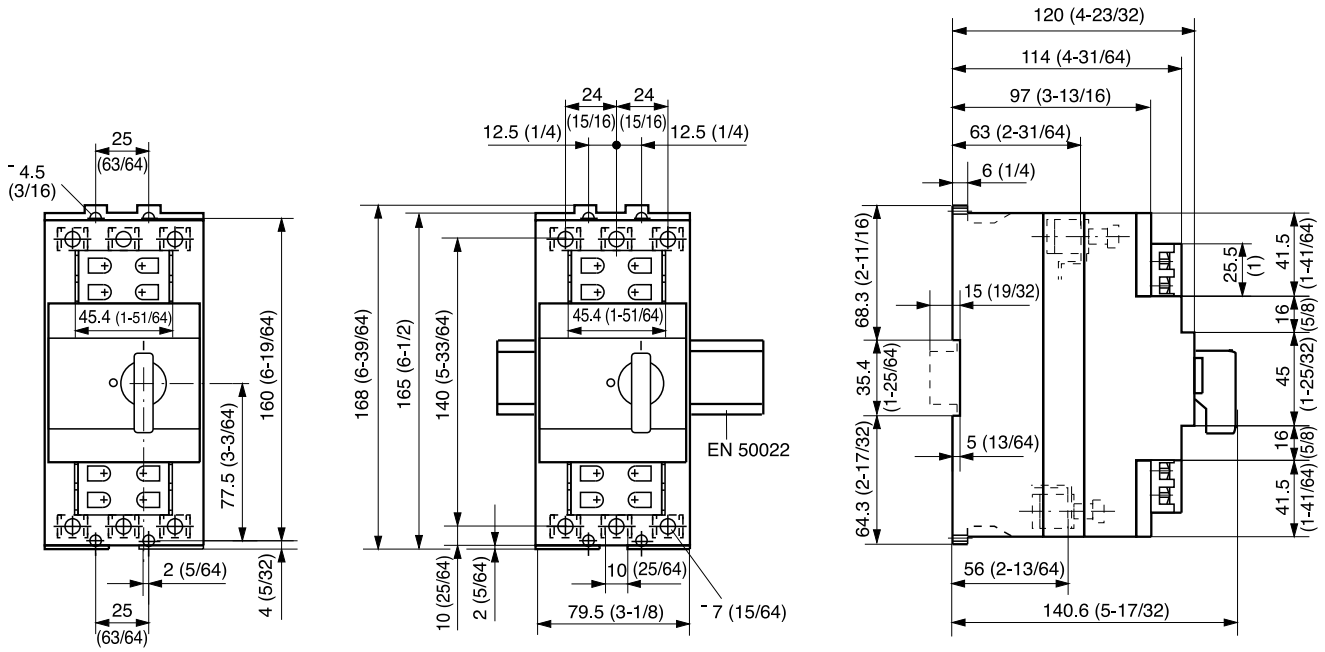


Figure 3 - 140-CD…

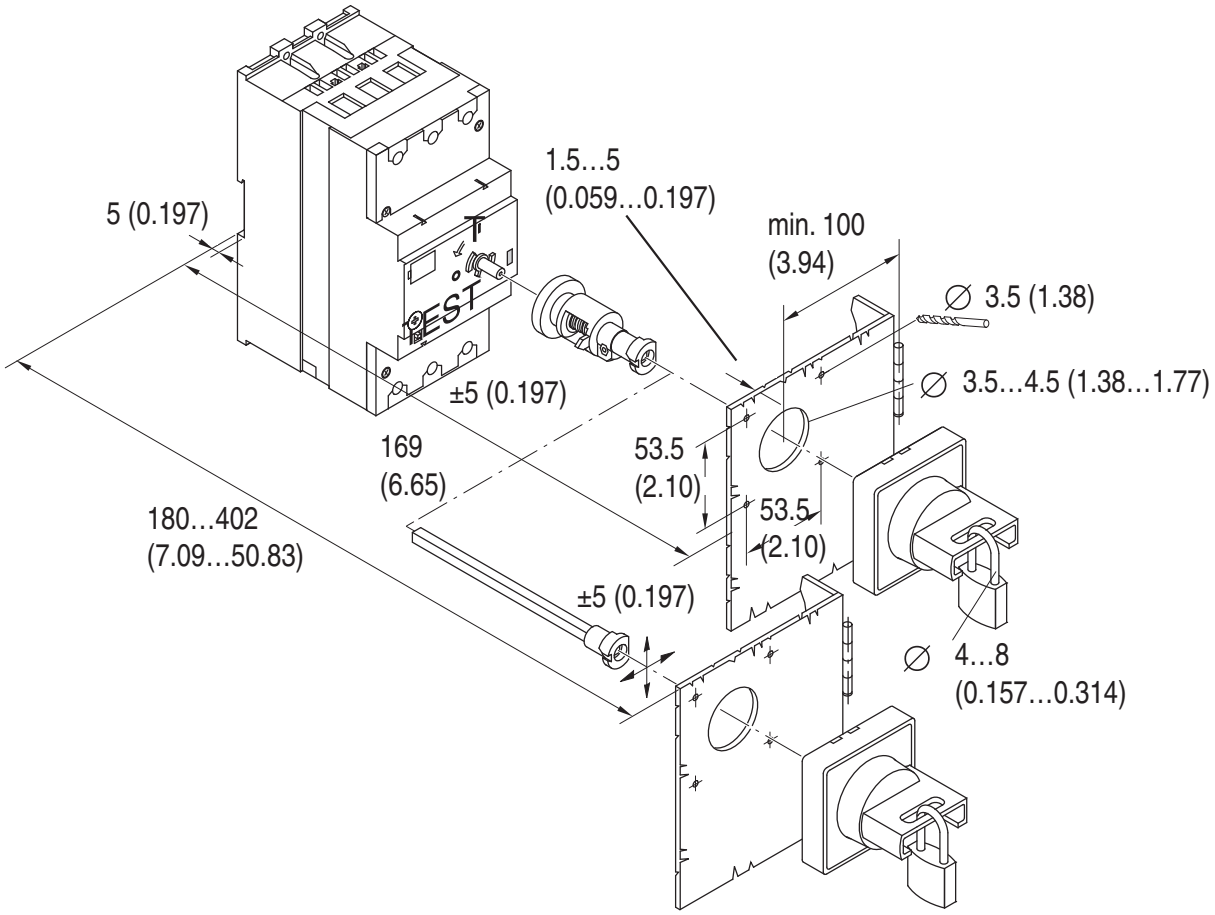
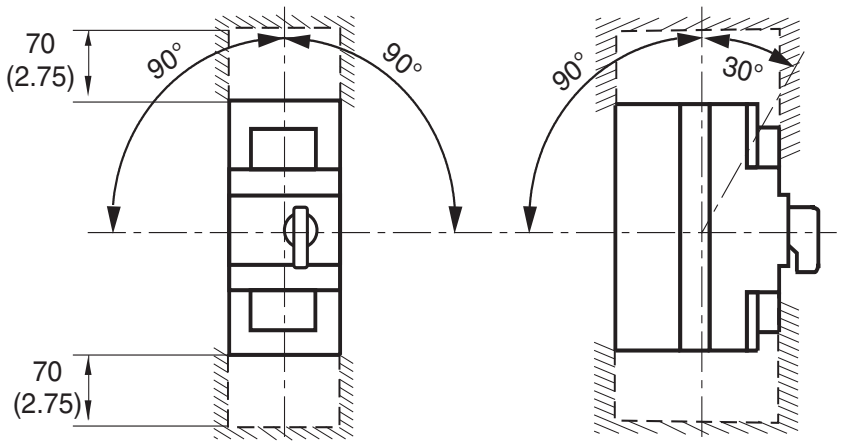


Figure 4 - Mounting position/safety clearance of Cat. No. 140-CMN



Notes:

Rockwell Automation Support

Use the following resources to access support information.

Technical Support Center	Knowledgebase Articles, How-to Videos, FAQs, Chat, User Forums, and Product Notification Updates.	www.rockwellautomation.com/knowledgebase
Local Technical Support Phone Numbers	Locate the phone number for your country.	www.rockwellautomation.com/global/support/get-support-now.page
Direct Dial Codes	Find the Direct Dial Code for your product. Use the code to route your call directly to a technical support engineer.	www.rockwellautomation.com/global/support/direct-dial.page
Literature Library	Installation Instructions, Manuals, Brochures, and Technical Data.	www.rockwellautomation.com/literature
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