

Multi 9™ System Catalog

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Section 1—Introduction

Multi 9™ Products for Equipment Applications

The Multi 9 modular system of miniature circuit breakers and supplementary protectors, accessories, and peripherals provides complete protection of equipment or especially sensitive circuits within the equipment. Installation labor and space are both minimized by the modular architecture of the Multi 9 system, whether a single protective device or multiple devices with their accessories are being used.

Schneider Electric offers an extensive line of UL 489/CSA C22.2 No.5 Circuit Breakers and UL 1077 Supplementary Protectors. In addition, a variety of IEC certified Circuit Breakers and Accessories are available for OEM's whose products are destined for export beyond North America. To an OEM, this means that one family of electrical protection products can be used regardless of equipment destination.

The Standards include:

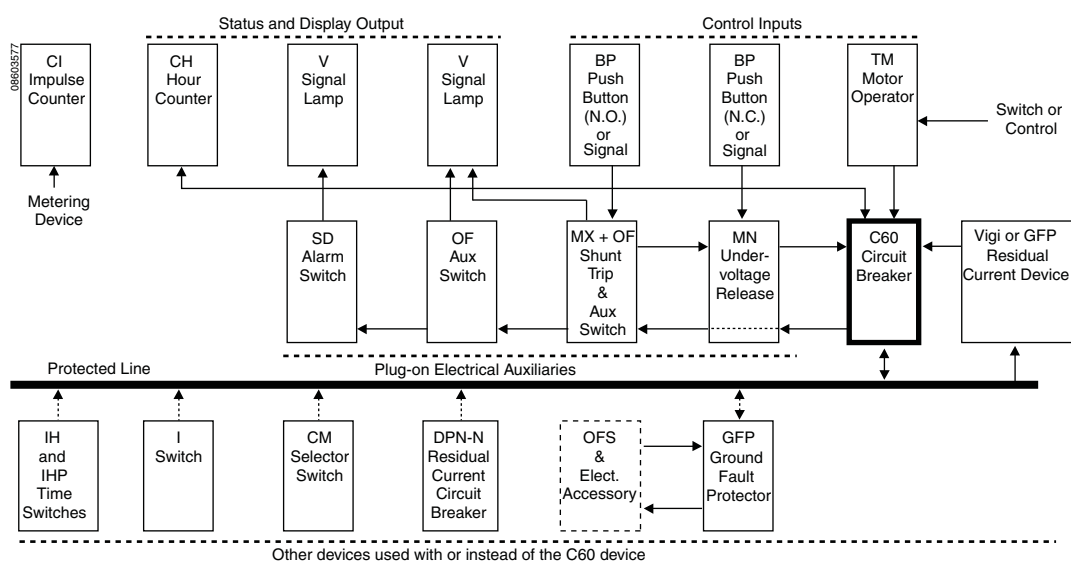
- UL 489 Standard for Circuit Breakers
- UL 489A Standard for DC Communication Applications
- UL 1077 Standard for Supplementary Protectors
- UL 1053 Ground Fault Sensing and Relaying Equipment
- IEC 60947-2 Low-voltage switchgear and controlgear - Part 2: Circuit-breakers
- CSA C22.2 No. 5 Standard for Circuit Breakers
- CSA C22.2 No. 235 Supplementary Protectors
- CCC Pending
- C60 Miniature Circuit Breakers are RoHS Compliant

Potential applications include semi-conductor machines, communication equipment, process control panels, computers, medical equipment, electronic controls, transformers, power supplies, and other electrical equipment.

System Flexibility

The Multi 9 System includes an extensive line of field-installable accessories. Plug-on electrical auxiliaries include shunt trip, undervoltage release, auxiliary switch, and alarm switch. Other protection devices include residual current devices, dc circuit breakers, and switches. Control and display devices include signal lamps, push buttons, and motor operators. There are also mechanical accessories for locking, operating, shielding, mounting, etc. The following diagram shows many of the Multi 9 system accessories.

Figure 1: Functional Diagram of Multi 9 System



Multi 9™ System Catalog

Section 1—Introduction

Advantages

Multi 9 C60 circuit breakers and supplementary protectors provide several features which are important to OEMs. These include:

- Small, compact size
- Easy installation on DIN rails
- Limits let-thru current
- Resetability, more convenient than fuses
- Electrical auxiliaries for control and status information
- Extensive variety of accessories

Figure 2: UL 489/CSA C22.2 No. 5 Listed Multi 9 C60 Circuit Breakers



Better Protection—Multi 9 supplementary protectors and miniature circuit breakers limit let-through current, providing faster separation of the component from the fault, thereby reducing system damage.

More Selection—More ratings compatible with low-power electronic circuits are available in the range from 0.5 to 10 A. Others are provided in convenient steps, up to 63 A for the C60 products.

Reduction of Nuisance Tripping—Available with different trip characteristics to meet system needs: B, C and D curves, depending on the model.

Panel Space Savings—Multi 9 products are compact. Width per pole is only 0.71 in. (18 mm) for the C60 circuit breaker. All of the products are built in a consistent format with incremental widths of 0.35 in. (9 mm) (therefore the name Multi 9).

Easy Installation—The Multi 9 products mount easily onto a 35 mm DIN mounting rail. Large box lug terminals (pressure plate type) are suitable for use with copper wiring up to 2 AWG for C60 circuit breakers and supplemental protectors.

Reverse Feeding—Reverse feeding of line power is permitted.

Reliability—Each C60 miniature circuit breaker has an endurance of 10,000 operation cycles and voltage withstand of 6000 V impulse rating.

World-Wide Availability—The Multi 9 products are available and supported throughout the world by Schneider Electric.

From the Power Distribution Specialists—Schneider Electric can be your single source of protection equipment, with a comprehensive line of products for OEM products or the factory. In addition to the Multi 9 circuit breakers and supplementary protectors, these products include the following:

- QO® and QOU Miniature Circuit Breakers 10–125 A
- Compact® Molded Case Circuit Breakers 15–3200 A
- Powerpact® Molded Case Circuit Breakers 15–3000 A
- Masterpact® Universal Power Circuit Breakers 250–6300 A

Conformance to Standards

Overview

Multi-9 circuit protection products conform to the standards most needed by OEMs—UL 489/CSA C22.2 No.5, UL 1077, CSA C22.2 No. 235, and IEC 60947-2.

Different applications call for circuit protection devices that meet different standards. The Multi 9 family allows OEMs to use a single family of products in their equipment, whether it is destined for the United States, Canada or an international market outside of North America. A variety of Multi 9 devices are tested per Underwriters Laboratories (UL) and Canadian Standards Association (CSA) Standards as required by the National Electrical Code® (NEC®) in the United States and the Canadian Electrical Code (CEC) in Canada. They are also tested per the standards of the International Electrotechnical Commission® (IEC®) and may therefore be used in International Markets where these products meet the requirements.

In this catalog, the products are grouped by the standards they are designed to meet, including:

- UL 489—Defines rigorous testing requirements for circuit breakers in the United States
- CSA C22.2 No. 5—Defines rigorous testing requirements for circuit breakers in Canada
- CSA C22.2 No. 235—Defines requirements for supplementary protectors
- UL 489A—Limited applications (dc circuits in communications equipment)
- UL 1077—Defines supplementary protectors for use within electrical equipment protected by branch circuit breakers
- IEC 60947-2—International standards for circuit breakers to be used in industrial applications

UL 489/CSA C22.2 No.5 Standard—Branch Circuit Protection

An OEM product as a whole must be appropriately protected from overcurrent conditions, either by connection in the field to a protected branch circuit (in accordance with NEC) or by inclusion of branch circuit protection within the product itself. In the United States, these branch circuit protection devices must comply with the UL 489/CSA C22.2 No.5 Standard for Molded-Case Circuit Breakers. (see UL 489/CSA C22.2 No.5 No. 1 in Figure 3, which is a drawing of a hypothetical piece of OEM equipment requiring multiple protection devices.)

Applications Requiring UL 489/CSA C22.2 No.5 Listed Circuit Breakers

In some instances, the protective devices being installed in equipment must comply with UL 489/CSA C22.2 No.5. These include the following situations:

1. If a circuit such as a convenience receptacle could leave the equipment, that circuit must be protected by a UL 489/CSA C22.2 No.5 branch circuit protection device (see UL 489/CSA C22.2 No.5 No. 2).
2. If a circuit such as to an external motor could leave the equipment, that circuit must be protected by a UL 489/CSA C22.2 No.5 branch circuit protection device (see UL 489 No. 3).
3. Motors within the equipment should also be protected by a UL 489/CSA C22.2 No.5 device (see UL 489 No. 4).
4. All equipment which requires HACR (Heating, Air Conditioning, and Refrigeration) rating must be protected by a UL 489/CSA C22.2 No.5 branch circuit protection device (see UL 489 No. 5).

NOTE: The motor control circuit may be protected by a UL 1077 device. *It must also have over current protection even though there is a UL 1077 device downstream.*

In general, a UL 489/CSA C22.2 No.5 circuit breaker could also be used in any application for which a UL 1077 device is allowed, since the UL 489/CSA C22.2 No.5 devices meet or exceed the requirements of UL 1077 devices. The converse of this is not true, since UL 1077 devices cannot meet the more stringent UL 489/CSA C22.2 No.5 Standard.

UL 1077 Standard—Supplementary Protection within the Product

Within the OEM product itself, additional (supplementary) protection for sensitive or critical internal circuitry may be provided by one or more supplementary circuit protectors. A supplementary protector is an overcurrent protection device which is specifically designed for OEM applications and which complies with UL 1077 Standard for Supplementary Protectors for Use in Electrical Equipment.

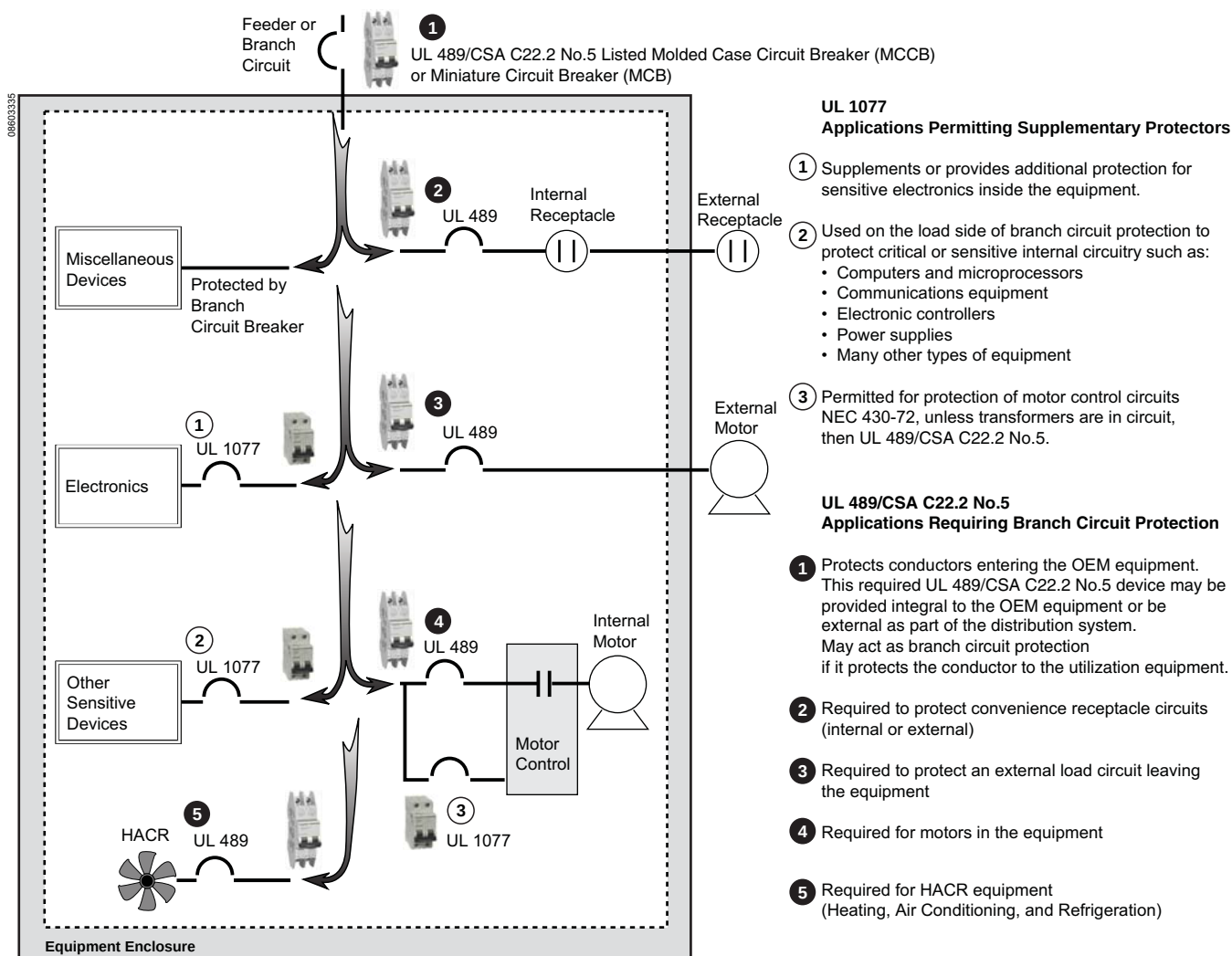
Under UL 1077, supplementary protectors may be used under the following conditions:

- When branch overcurrent protection is already provided
- If short-circuit protection is needed for sensitive devices within the equipment
- When wiring connected to the supplementary protector does not exit the equipment to external devices such as receptacles or motors
- If the UL 1077 device does not provide the only means of disconnecting the product

The following applications illustrated in Figure 3 allow the use of UL 1077 supplementary protectors:

- The supplementary protection is used to supplement or provide additional protection to sensitive components inside the equipment (see UL 1077 No. 1). A UL 489/CSA C22.2 No.5 circuit breaker must be located upstream from the equipment.
- Critical or sensitive internal circuitry (see UL 1077 No. 2) such as: Computers and microprocessors, communications equipment, electronic controllers, power supplies and many other types of equipment
- Motor control circuits may be protected by a UL 1077 device, unless the circuit includes a transformer (in which case a UL 489/CSA C22.2 No.5 device is required).

Figure 3: Guidelines for Application of UL 489/CSA C22.2 No.5 Circuit Breakers and UL 1077 Supplementary Protectors



NOTE: This is a simplified summary of the standards. Refer to applicable codes for specific applications.

Comparing Terminology for UL 489/CSA C22.2 No.5 and 1077 Standards

The terms used to differentiate these products can cause confusion if a user is not careful. Misapplying the terms may result in misapplication of the products.

Any one of the following terms can be used to identify supplementary protectors:

- Supplementary protector
- UL Recognized
- UL 1077
- The UL symbol 

Any of the following terms can be used to identify circuit breakers:

- Circuit breaker
- UL Listed
- UL 489/CSA C22.2 No.5
- The UL symbol 

UL 489A Standard—DC Telecommunication Applications

The UL 489A Standard covers dc rated circuit breakers intended to provide branch circuit protection in telecommunications equipment. The products are marked as UL Listed circuit breakers for use in telecommunication equipment.

UL 486 Standard—Connection Terminals

The UL 486 Standard applies to compression wiring connection terminals. It is a requirement for connections of a UL 489/CSA C22.2 No.5 circuit breaker. Although it is not a requirement for UL 1077 Recognized devices, UL 486 Rated terminals are included on those Multi 9 products. This allows the user to apply field wiring directly to any of these devices, without using intermediate, UL rated terminal blocks.

The connectors on Multi 9 devices are Rated UL 486A-B, which applies to copper conductors.

These standards apply to field-wired terminals that are an integral part of the equipment. Criteria includes static heating tests, secureness tests, and pull-out tests.

IEC 60947-2 Standard

In countries which follow the IEC Standards, IEC 60947-2 is used for most industrial applications of circuit protection. IEC 60947-2 does not distinguish between the two levels of protection equivalent to UL 489/CSA C22.2 No.5 circuit breakers and 1077 supplementary protectors. Therefore, in equipment like that illustrated in figure 3, if IEC guidelines apply, then all of the devices could be selected from the IEC Rated portion of this catalog.

IEC 60898 Standard

The IEC 60898 Standard is less stringent than 60947-2. It applies primarily to residential applications of circuit breakers in countries adhering to IEC Standards, and is not generally applicable to OEMs.

CSA C22.2 Standard

The CSA® (Canadian Standards Association®) C22.2 Standards closely correspond to the UL Standards: CSA C22.2 No. 5-02 (harmonized to UL 489/CSA C22.2 No.5) and CSA C22.2 No. 235 (equivalent to UL 1077). All UL rated devices also have the corresponding CSA rating, unless otherwise noted.

CCC Mark



CCC Mark

The China Compulsory Certification (CCC) mark is a new safety and quality mark system. Compulsory Product Certification System (CPCS) prohibits the sale or importation of equipment under the scope of the law that does not bear the CCC Mark issued by a Designated Certification Body (DCB). The CCC Mark covers both safety and Electromagnetic compatibility.

The CPCS regulates 22 different product groups, which include the following:

Electrical wires and cables; switches for circuits, installation protective and connection devices; low-voltage electrical apparatus; small power motors; electric tools; welding machines; household and similar electrical appliances; audio and video apparatus; information technology equipment; lighting apparatus; telecommunications terminal equipment; motor vehicles and safety parts; motor vehicle tires; safety glass; agricultural machinery; latex products; medical devices; fire fighting equipment; detectors for intruder alarm systems; wireless local area network equipment; security and protection equipment; and decoration and renovation products.

UL 508 Standard—Manual Motor Controllers

UL Standard 508 covers industrial control equipment, specifically for motor control functions. It covers individual devices as well as assemblies.

There are UL 508 Listed manual motor controllers that look much like miniature circuit breakers, and have thermal settings and instantaneous settings similar to circuit breakers. These are specialized devices and cannot be used for a wide range of applications, as can UL 1077 and UL 489/CSA C22.2 No.5 devices.

Like UL 1077 supplementary protectors, a UL 508 Listed manual motor controller (or a group of them) must be protected by a UL 489/CSA C22.2 No.5 Listed branch circuit breaker.

Manual motor controllers are available from Schneider Electric (Telemecanique products GV2 and GV3) but are not included in this catalog.

Table 1: Comparison Summary of Applicable UL® and IEC® Standards

Characteristic	UL® 489/CSA C22.2 No. 5	UL® 1077/CSA C22.2 No. 235	IEC® 60947-2
Labeling	UL Listed	UL Recognized component	IEC Certified device
Nomenclature	Circuit breakers	Supplementary protectors	Circuit breakers or supplementary protectors
Dielectric test (for 240 Vac)	2 times rated plus 1000 V for 1 minute (1,480 at 240 Vac)	2 times rated plus 1,000 V for 1 minute (1,480 at 240 Vac)	1,500 V
Interrupting rating	10 kA at 240 Vac	10 kA at 240 Vac	20 kA at 240 Vac
Overload protection	50 operations at 600% rating	50 operations at 150% rating	12 operations at 600% rating
Service capacity	Must be operational after two interruptions	May be tested in series with branch circuit device and may become inoperable after test	Must be operational after two interruptions
Calibration test	200% I _n , 2 minutes max. (0–30 A)	Per manufacturer's trip curve	At 200% I _n , time shall not exceed manufacturer's stated value
Calibration temperature	25°C (77°F), unless other value specified by manufacturer	Manufacturer must specify	Manufacturer must specify
Testing temperature	25°C (77°F) ambient, 50°C (122°F) rise max. at terminals	25°C (77°F) ambient, 50°C (122°F) rise max. at field wiring terminals; 65°C (149°F) rise max. on factory wiring terminals	At 25°C (77°F) ambient, 80°C (176°F) rise max. at terminals
Endurance	6000 operations at rated current and voltage, 75-80% PF, plus 4000 operations at no load	6000 operations at rated current and voltage, 75-80% PF	1500 operations at rated current and voltage, 75-80% PF
Air spacing	3/4 in. (20.1 mm)	3/8 in. (9.53 mm)	See dielectric
Surface spacing	1-1/4 in. (31.8 mm)	1/2 in. (12.7 mm)	See dielectric
Test and follow up tests	Initial, periodic and quarterly follow-up tests observed by UL representative	Initial tests observed by UL representative, plus quarterly visual follow-up inspection by UL	Conducted by manufacturer

Section 2—UL and CSA Rated Protection Devices

The Multi 9 system includes several families of miniature circuit protection devices that have the UL ratings required in the United States and some other countries. The products are summarized below and are described in detail on the following pages. They include the following families:

- UL Listed C60 240 V Circuit Breakers (UL 489/CSA C22.2 No.5)
- UL Listed C60 480 V Circuit Breakers (UL 489/CSA C22.2 No.5)
- UL Listed C60 Circuit Breakers for use in Communication Equipment (UL 489A) not CSA certified
- UL Recognized C60 Supplementary Protectors (UL 1077 and CSA C22.2 No. 235)

NOTE: Protection devices with only IEC ratings are described in Section 3, while accessories for both the UL and IEC devices are described in Section 5.

Table 2: Specifications for UL 489/CSA C22.2 No.5 and 489A Listed C60 Circuit Breakers

Ratings per UL Standards			UL 489/CSA C22.2 No.5 C60 (240 Vac)			UL 489/CSA C22.2 No.5 C60 (480Y/277 Vac)			UL 489A C60 (60 Vdc)
Number of Poles			1P	2P	3P	1P	2P	3P	1P
Rated Current at 77°F (25°C)			0.5–35 A	0.5–35 A	0.5–35 A	0.5–20 A	1–20 A	1–20 A	0.5–63 A
Interrupting Ratings as per UL 489/CSA C22.2 No.5	AC 50/60 Hz	120 V	10 kA	—	—	10 kA	—	—	—
		240 V	10 kA	10 kA	10 kA	10 kA	10 kA	10 kA	—
		277 V	—	—	—	10 kA	10 kA	10 kA	—
		480Y/277 V	—	—	—	—	10 kA	10 kA	—
	DC	60 V	10 kA	10 kA	—	—	—	—	10 kA
		125 V	—	10 kA	—	—	—	—	—
Ultimate Breaking Capacity (I _{cu}) as per IEC 60947-2	AC 50/60 Hz	240 V	10 kA	20 kA	20 kA	10 kA	10 kA	10 kA	—
		415 V	10 kA	10 kA	10 kA	10 kA	10 kA	10 kA	—
		440 V	—	6 kA	6 kA	—	6 kA	6 kA	—
Service Breaking Capacity (I _{cs}) (%I _{cu})			75%	75%	75%	75%	75%	75%	75%
Magnetic Setting (Times Ampere Rating)	B curve		—			—			—
	C curve		7 to 10			7 to 10			7 to 14
	D curve		10 to 14			10 to 14			—
Dimensions (in./mm)	Width		0.71/18	1.42/36	2.13/54	0.71/18	1.42/36	2.13/54	0.71/18
	Height	box/box	4.21/107	4.21/107	4.21/107	5.56/141	5.56/141	5.56/141	3.19/81
		ring/ring ¹	4.86/123.4	4.86/123.4	4.86/123.4	5.56/141	5.56/141	5.56/141	—
		box/ring	4.54/115	4.54/115	4.54/115	—	—	—	—
	Depth		3.00/76	3.00/76	3.00/76	3.00/76	3.00/76	3.00/76	3.00/76
Weight (oz./g) max.	box/box		4.4/136	8.7/271	13.1/407	5.3 (166)	10.6/332	15.9 (498)	3.85/110
	ring/ring		5.2/161	10.3/321	15.5/482	5.3 (166)	10.6/332	15.9 (498)	—
	box/ring		4.8/148	9.5/297	14.3/445	—	—	—	—

¹ Fingersafe 240 V C60 circuit breaker ring terminal dimensions are same as the 480V C60 circuit breaker.

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Section 2—UL and CSA Rated Protection Devices

Figure 4: UL 1077 Recognized C60 Supplementary Protectors



Table 3: Specifications for UL 1077 Recognized Supplementary Protectors

Ratings per UL Standards			UL 1077 C60			
Number of Poles			1P	2P	3P	4P
Rated Current at 77°F (25°C)			0.5–63 A	0.5–63 A	0.5–63 A	0.5–63 A
Interrupting Ratings as per UL 1077	50/60 Hz	120 Vac	10 kA	—	—	—
		240 Vac	10 kA	10 kA	10 kA	10 kA
		277 Vac	5 kA	—	—	—
		480Y/277 Vac	—	5 kA	5 kA	5 kA
	—	65 Vdc	10 kA	—	—	—
		125 Vdc	—	10 kA	—	—
Ultimate Breaking Capacity (I _{cu}) as per IEC 60947-2	50/60 Hz	240 Vac	10 kA	20 kA	20 kA	20 kA
		415 Vac	3 kA	10 kA	10 kA	10 kA
		440 Vac	—	6 kA	6 kA	6 kA
Service Breaking Capacity (I _{cs}) (%I _{cu})			75%	75%	75%	75%
Plug-On Auxiliary Modules with Mechanical Linkage:			MN Undervoltage Trip			
			MX + OF Shunt Trip/Auxiliary Switch			
			OF Auxiliary Switch			
			SD Alarm Switch			
Magnetic Setting	B Curve		Between 3.2 and 4.8 Times Ampere Rating			
	C Curve		Between 7 and 10 Times Ampere Rating (Between 7 and 14 for dc)			
	D Curve		Between 10 and 14 Times Ampere Rating (No DC Rating for D Curve)			
Dimensions (in./mm)	Width		0.71/18	1.42/36	2.13/54	2.84/72
	Height		3.19/81	3.19/81	3.19/81	3.19/81
	Depth		3.00/76	3.00/76	3.00/76	3.00/76
Weight (oz./g)			3.85/110	7.70/220	11.55/330	15.40/440

UL 489/CSA C22.2 No.5 Listed 240 Vac C60 Circuit Breakers (AC)

A selected range of Multi-9 circuit breakers rated 240 V are UL 489/CSA C22.2 No.5 Listed. Unlike UL 1077 Supplementary Protectors, these UL 489/CSA C22.2 No.5 circuit breakers can be used for branch circuit protection as required by the National Electrical Code.

As shown in tables Table 5 and Table 6, the UL 489/CSA C22.2 No.5 Listed products are available in C and D curves. They include devices ranging from 0.5 to 35 A.

UL 489/CSA C22.2 No.5 Listed Multi 9 C60 Circuit Breakers



Table 4: Specifications for UL 489/CSA C22.2 No.5 240 V Listed C60 Circuit Breakers

High Voltage Withstand	6 kV	
Connector: Box Lug	Rating	UL 486A File No. E216919 (Use with Copper Wire Only)
	Connection	0.5–25 A: 14–4 AWG (2–25 mm ²) Cables Torque to 22 lb-in. (2.48 N•m) 30–35 A: 14–2 AWG (1–35 mm ²) Cables Torque to 31 lb-in. (3.52 N•m)
Connector: Ring Tongue	Use Single UL Listed or CSA Certified Insulated Ring Tongue Only	Screw dia. 0.2 in. (5 mm) Torque to 18 lb-in. (2.03 N•m)
	Max Ring Terminal Width	0.54 in. (14 mm)
Mounting	35 mm DIN rail	
Degree of Protection	Case	IP40 as per IEC 529
	Terminals	IP20
Temperatures	Calibration	25°C (77°F)
	Storage	-40 to 80°C (-40 to 176°F)
	Operating	-30 to 70°C (-22 to 158°F)
Plug-On Auxiliary Modules with Mechanical Linkage:	MN Undervoltage Trip	
	MX + OF Shunt Trip/Auxiliary Switch	
	OF Auxiliary Switch	
	SD Alarm Switch	
Tropicalization	Treatment 2	Relative Humidity: 95% at 131°F (55°C)
Number of Operating Cycles	Electrical (O-C)	6,000 load, 4,000 no-load

See specifications Table 2 for dimensions, weights and interrupting ratings

Standard Features

- Fast closing: Allows increased withstand to the high inrush currents of some loads.
- Trip-free mechanism: Contacts cannot be held in the I-ON position when the C60 circuit breaker is tripped automatically.
- Positive indication of contact disconnect. Green mechanical indication on front face of circuit breaker shows that all poles are open.
- C curve: Overcurrent protection for all application types. Magnetic release operates from 7 to 10 times ampere rating (7 to 14 for DC applications).

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- D curve: Overcurrent protection for loads with high inrush currents (motors, transformers). Magnetic release operates between 10 and 14 times ampere rating (no dc rating for D curve).
- Suitable for reverse feeding.
- Allows locking in O-OFF position using padlock attachment.

Connections

Three versions of field wiring connectors are available for the 240 Vac UL 489/CSA C22.2 No.5 Listed devices:

- Box lug, meeting UL 486A requirements
- Ring tongue terminal with 5 mm screw
- Ring Tongue terminals with Fingersafe (IP20) shrouds

The circuit breakers can be ordered with the following combinations of connectors:

- Line terminal box lug/load terminal box lug
- Line terminal ring tongue/load terminal ring tongue (for fingersafe version, add -F suffix to catalog number)

Figure 5: Connection Options for 240 Vac UL 489/CSA C22.2 No.5 Listed Devices



Standards

- UL 489 Circuit Breaker: File No. E215117
- Single pole 15–20 A is UL Listed as SWD (switching duty).
- 1-, 2-, and 3-pole 15–35 A are HID (high intensity discharge) rated.
- CSA C22.2 No. 5.1 Circuit Breakers: File No. 179014
- IEC 60947-2
- CE Marked

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Section 2—UL and CSA Rated Protection Devices

Catalog Numbers

Table 5: Catalog Numbers for C Curve, UL 489/CSA C22.2 No.5 Listed 240 Vac C60 Miniature Circuit Breakers (Box Lug and Ring Tongue Terminal Combinations)

Rating	1P		2P		3P	
	Box/Box	Ring/Ring ¹	Box/Box	Ring/Ring ¹	Box/Box	Ring/Ring ¹
0.5 A	60100	60200	60134	60234	—	—
1 A	60101	60201	60135	60235	60168	60268
1.5 A	60102	60202	60136	60236	60169	60269
2 A	60103	60203	60137	60237	60170	60270
3 A	60104	60204	60138	60238	60171	60271
4 A	60105	60205	60139	60239	60172	60272
5 A	60106	60206	60140	60240	60173	60273
6 A	60107	60207	60141	60241	60174	60274
7 A	60108	60208	60142	60242	60175	60275
8 A	60109	60209	60143	60243	60176	60276
10 A	60110	60210	60144	60244	60177	60277
13 A	60111	60211	60145	60245	60178	60278
15 A	60112	60212	60146	60246	60179	60279
20 A	60113	60213	60147	60247	60180	60280
25 A	60114	60214	60148	60248	60181	60281
30 A	60115	60215	60149	60249	60182	60282
35 A	60116	60216	60150	60250	60183	60283

¹ IP-20 Fingersafe ring tongue terminals may be ordered with an F suffix (example: 60210F)

Table 6: Catalog Numbers for D Curve, UL 489/CSA C22.2 No.5 Listed 240 Vac C60 Miniature Circuit Breakers (Line/Load as Box Lug or Ring Tongue Terminals)

Rating	1P		2P		3P	
	Box/Box	Ring/Ring ¹	Box/Box	Ring/Ring ¹	Box/Box	Ring/Ring ¹
0.5 A	60117	60217	60151	60251	—	—
1 A	60118	60218	60152	60252	60184	60284
1.5 A	60119	60219	60153	60253	60185	60285
2 A	60120	60220	60154	60254	60186	60286
3 A	60121	60221	60155	60255	60187	60287
4 A	60122	60222	60156	60256	60188	60288
5 A	60123	60223	60157	60257	60189	60289
6 A	60124	60224	60158	60258	60190	60290
7 A	60125	60225	60159	60259	60191	60291
8 A	60126	60226	60160	60260	60192	60292
10 A	60127	60227	60161	60261	60193	60293
13 A	60128	60228	60162	60262	60194	60294
15 A	60129	60229	60163	60263	60195	60295
20 A	60130	60230	60164	60264	60196	60296
25 A	60131	60231	60165	60265	60197	60297
30 A	60132	60232	60166	60266	60198	60298
35 A	60133	60233	60167	60267	60199	60299

¹ IP-20 Fingersafe ring tongue terminals may be ordered with an F suffix (example: 60210F)

NOTE: UL 489/CSA C22.2 No.5 Listed Multi 9 circuit breakers are calibrated at 25°C (77°F). Please refer to the rating tables (page 83) for applications at temperatures greater than 25°C (77°F).

NOTE: The NEC requires that the continuous load applied to the circuit breaker shall not exceed 80% of the circuit breaker ampere rating.

UL 489/CSA C22.2 No. 5 Listed 480Y/277 Vac C60 Circuit Breakers (AC)



The UL 489/CSA C22.2 No.5 Listed 480Y/277 Vac Multi 9 C60 miniature circuit breakers can be used in 480Y/277 Vac systems. With amperages from 0.5 A to 20 A, they are ideal for fuse replacement, yet carry the UL 489/CSA C22.2 No.5 Listing that is required for branch circuit applications. See specifications on Table 2 for dimensions, weights, and interrupting ratings.

Table 7: Specifications for UL 489/CSA C22.2 No.5 Listed 480Y/277 Vac C60 Circuit Breakers

Interruption Rating	2P and 3P 1P	480Y/277 V @ 10kA 277 Vac @ 10kA
Amperage	0.5 A through 20 A	
Construction	1P, 2P and 3P	
Magnetic Trip Curves	C-curve	7 to 10 Times Ampere Rating
	D-curve	10 to 14 Times Ampere Rating
UL 486E Listed Lug	18–16 AWG (1–1.5 mm ²), Cu Only Stranded Wire:	Torque to 7 lb-in (0.68 N•m)
	14–10 AWG (2–5 mm ²), Cu Only Solid or Stranded Wire	Torque to 14 lb-in (1.6 N•m)
Ring Tongue Screw	5 mm	Torque to 18 lb-in (2 N•m)
Plug-On Auxiliary Modules With Mechanical Linkage:	MN Undervoltage Trip	
	MX + OF Shunt Trip/Auxiliary Switch	
	OF Auxiliary Switch	
	SD Alarm Switch	
Mounting	35 mm DIN Rail	

See selection Table 2 for dimensions, weights, and interrupting ratings.

Benefits

- Satisfies customer's preferences to use circuit breakers instead of fuses.
- Eliminates costs of spare fuses, blown fuse indicators, additional wiring, etc.
- Reduces concerns and uncertainty of misapplying a UL 1077 supplementary protector where a UL 489 branch circuit breaker is required.
- Facilitates one common design for UL 489/CSA C22.2 No.5, CSA and IEC applications.
- Simplifies installation with a compact, DIN-mounted circuit breaker that accepts a wide range of accessories.
- Offers alternative terminations for ring terminals or cable.

Standard Features

- Fast closing: Allows increased withstand to the high inrush currents of some loads.
- Trip-free mechanism: Contacts cannot be held in the I-ON position when the circuit breaker is tripped automatically.
- Positive indication of contact disconnect. Green mechanical indication on front face of device shows that all poles are open.
- C curve: Overcurrent protection for all application types. Magnetic release operates from 7 to 10 times ampere rating. (7 to 14 for dc)
- D curve: Overcurrent protection for loads with high inrush currents (motors, transformers). Magnetic release operates between 10 and 14 times ampere rating (no dc rating for D curve).
- Suitable for reverse feeding
- Allows locking in O-OFF position using padlock attachment.

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Section 2—UL and CSA Rated Protection Devices

Connections

Two versions of field wiring connectors are available:

- Single-barrel lug with binding screws for two 18–10 AWG wires.
- Crimp-type ring tongue terminal for up to 8 AWG wire

Both of these terminals provide fingersafe ingress protection per IP20 of IEC EN60529. This feature reduces the potential of incidental contact with live circuit breaker components.

Standards

- UL 489/CSA C22.2 No.5 Listed
- IEC 60947-2
- CE Marked

Catalog Numbers

Table 8: Catalog Numbers for UL 489/CSA C22.2 No.5 Listed 480Y/277 V C60 Miniature Circuit Breakers (AC)

Rating	Single Barrel Wire Lug			Ring-Tongue Terminal		
	1P	2P	3P	1P	2P	3P
C-curve, 7–10 Times Ampere Rating						
0.5 A	MGN61300	—	—	MGN61366	—	—
1 A	MGN61301	MGN61312	MGN61323	MGN61367	MGN61378	MGN61389
2 A	MGN61302	MGN61313	MGN61324	MGN61368	MGN61379	MGN61390
3 A	MGN61303	MGN61314	MGN61325	MGN61369	MGN61380	MGN61391
4 A	MGN61304	MGN61315	MGN61326	MGN61370	MGN61381	MGN61392
5 A	MGN61305	MGN61316	MGN61327	MGN61371	MGN61382	MGN61393
6 A	MGN61306	MGN61317	MGN61328	MGN61372	MGN61383	MGN61394
8 A	MGN61307	MGN61318	MGN61329	MGN61373	MGN61384	MGN61395
10 A	MGN61308	MGN61319	MGN61330	MGN61374	MGN61385	MGN61396
15 A	MGN61309	MGN61320	MGN61331	MGN61375	MGN61386	MGN61397
20 A	MGN61310	MGN61321	MGN61332	MGN61376	MGN61387	MGN61398
D-curve, 10–14 Times Ampere Rating						
0.5 A	MGN61333	—	—	MGN61399	—	—
1 A	MGN61334	MGN61345	MGN61356	MGN61400	MGN61411	MGN61422
2 A	MGN61335	MGN61346	MGN61357	MGN61401	MGN61412	MGN61423
3 A	MGN61336	MGN61347	MGN61358	MGN61402	MGN61413	MGN61424
4 A	MGN61337	MGN61348	MGN61359	MGN61403	MGN61414	MGN61425
5 A	MGN61338	MGN61349	MGN61360	MGN61404	MGN61415	MGN61426
6 A	MGN61339	MGN61350	MGN61361	MGN61405	MGN61416	MGN61427
8 A	MGN61340	MGN61351	MGN61362	MGN61406	MGN61417	MGN61428
10 A	MGN61341	MGN61352	MGN61363	MGN61407	MGN61418	MGN61429
15 A	MGN61342	MGN61353	MGN61364	MGN61408	MGN61419	MGN61430
20 A	MGN61343	MGN61354	MGN61365	MGN61409	MGN61420	MGN61431

UL 489/CSA C22.2 No. 5 Listed C60 Circuit Breakers (DC)

Overview

A portion of the range of UL 489/CSA C22.2 No.5 circuit breakers are also Listed by UL for use with dc circuits. The specifications are the same as the UL 489/CSA C22.2 No.5 circuit breakers, with the following exceptions:

- Number of poles: 1 and 2
- Time/current curve: C curve
- Magnetic setting of C curve: between 7 and 14 times ampere rating
- DC voltage (nominal): 1 pole—60 Vdc, 2 pole—125 Vdc
- Connection: box lug, ring/ring only (same torque)



Table 9: Specifications for UL 489/CSA C22.2 No.5 C60 DC Circuit Breakers

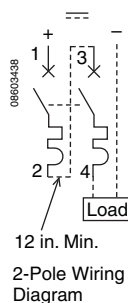
Ratings per UL Standards		UL 489/CSA C22.2 No.5 C60 (DC)	
Number of Poles		1	2
Rated Current (A) at 77°F (25°C)		60 Vdc	
Interrupting Ratings per UL 489/CSA C22.2 No.5 (kA)	60 Vdc	10	—
	125 Vdc	—	10
Service Breaking Capacity (Ics) (%Icu)		75%	75%
Magnetic Setting (Times Ampere Rating)	B curve	—	—
	C Curve	7 to 14	7 to 14
	D Curve	—	—
Dimensions	Width	0.71 in. (18 mm)	1.42 in. (36 mm)
	Height (Box/Box)	4.21 in. (107 mm)	4.21 in. (107 mm)
	Depth	3.00 in. (76 mm)	—
Weight (Max.)		4.4 oz. (136 g)	8.7 oz. (271 g)

Catalog Numbers

Table 10: Catalog Numbers for UL 489/CSA C22.2 No.5 C60 Listed Miniature Circuit Breakers (DC)¹

Rating	C Curve				Rating	C Curve			
	1P, Box/Box	Ring/Ring	2P, Box/Box	Ring/Ring		1P, Box/Box	Ring/Ring	2P, Box/Box	Ring/Ring
0.5 A	60100	60200	60134	60234	10 A	60110	60210	60144	60244
1 A	60101	60201	60135	60235	13 A	60111	60211	60145	60245
1.5 A	60102	60202	60136	60236	15 A	60112	60212	60146	60246
2 A	60103	60203	60137	60237	20 A	60113	60213	60147	60247
3 A	60104	60204	60138	60238	25 A	60114	60214	60148	60248
4 A	60105	60205	60139	60239	30 A	60115	60215	60149	60249
5 A	60106	60206	60140	60240	35 A	60116	60216	60150	60250
6 A	60107	60207	60141	60241	40 A	—	—	—	—
7 A	60108	60208	60142	60242	50 A	—	—	—	—
8 A	60109	60209	60143	60243	63 A	—	—	—	—

¹ The dc catalog numbers are the same as the UL 489/CSA C22.2 No.5 ac equivalents.



UL 489A Listed C60N Miniature Circuit Breakers for DC Telecommunication Applications

A limited range of the C60N products are UL Listed as UL 489A circuit breakers for protection of DC telecommunications circuits, not CSA certified.



Table 11: Specifications for UL 489A DC Circuit Breakers

Package Size	0.71 in. (18 mm)	1 pole only
Voltage	Nominal Voltage	60 Vdc
Connection, Box Lug	Cable: 0.5–25 A: 18–4 AWG (1–25 mm ²) Cu Only	Torque 22 lb-in (2.49 N•m)
UL 486A File No. E90509 pending	Cable: 30–60 A: 18–2 AWG (1–35 mm ²) Cu Only	Torque 31 lb-in (3.50 N•m)
Optional Ring Terminal Kit	Screw Dia.: 0.2 in. (5mm)	Torque 18 lb-in (2.03 N•m)
Mounting	35 mm DIN rail	
Time-Current Curves	C Curve	Magnetic Setting: 7–14 Times Ampere Rating
Degree of Protection as per IEC 68-2-30	Case	IP40 as per IEC 529
	Terminals	IP20
Temperatures	Calibration	25°C (77°F)
	Storage	-40 to 80°C (-40 to 176°F)
	Operating	-30 to 70°C (-22 to 158°F)
Tropicalization	Treatment 2	Relative Humidity: 95% at 55°C (131°F)
Number of Operating Cycles:	Electrical (O-C)	10,000 at 0.5–63 A
Plug-On Auxiliary Modules With Mechanical Linkage:	MN Undervoltage Trip	
	MX + OF Shunt Trip/Auxiliary Switch	
	OF Auxiliary Switch	
	SD Alarm Switch	
See selection Table 2 for dimensions, weights and interrupting ratings		

Catalog Numbers

Table 12: Catalog Numbers for UL 489A Circuit Breakers for DC Telecommunications Applications

Rating	C Curve	Rating	C Curve	Rating	C Curve	Rating	C Curve
	1P, 2 Modules		1P, 2 Modules		1P, 2 Modules		1P, 2 Modules
0.5 A	60406	4 A	60410	10 A	60414	30 A	60418
1 A	60407	5 A	60411	13 A	60415	40 A	60419
2 A	60408	6 A	60412	15 A	60416	50 A	60420
3 A	60409	8 A	60413	20 A	60417	60 A	60421

UL 1077 Recognized C60 Supplementary Protectors

The UL 1077 products are intended for use as supplementary protectors to provide overcurrent protection within appliances or electrical equipment where branch circuit protection is already provided or is not required.

As shown in the table of catalog numbers below, the UL 1077 Recognized products are available in B, C and D curves. They include devices ranging from 0.5 A to 63 A.

Figure 6: UL 1077 Recognized C60N Supplementary Protectors



Table 13: Specifications for UL 1077 Recognized C60 Supplementary Protectors

Package Size	0.71 in. (18 mm)	Width per Pole
Voltage	Nominal Voltage	480Y/277 Vac
	High Voltage Withstand	6 kV
Connection, Box Lug	Cable: 0.5–25 A: 14–4 AWG (2–25 mm ²) Cu Only	Torque 22 lb-in (2.49 N•m)
UL 486A File No. E90509 Pending	Cable: 30–63 A: 14–2 AWG (2–35 mm ²) Cu Only	Torque 31 lb-in (3.50 N•m)
Optional Ring Terminal Kit	Screw Dia.: 0.2 in. (5mm)	Torque 18 lb-in (2.03 N•m)
Mounting	35 mm DIN rail	
Time-Current Curves	B, C, and D Curves	
Degree of Protection as per IEC 68-2-30	Case	IP40 as per IEC 529
	Terminals	IP20
Temperatures	Calibration	25°C (77°F)
	Storage	-40 to 80°C (-40 to 176°F)
	Operating	-30 to 70°C (-22 to 158°F)
Tropicalization	Treatment 2	Relative Humidity: 95% at 131°F (55°C)
Number of Operating Cycles:	Electrical (O-C)	10,000 at 0.5–63 A
See Specification Table 3 for dimensions, weights and interrupting ratings		

Standards

- UL 1077 Circuit Breaker, File No. E90509
- CSA C22.2 No. 235 File No. 179014
- IEC 60947-2
- VDE 0660
- CE Marked

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Section 2—UL and CSA Rated Protection Devices

Standard Features

- Trip-free mechanism: Contacts cannot be held in the on position when the C60 is tripped automatically.
- Positive indication of contact disconnect. Green mechanical indication on front face of device shows that all poles are open.
- B curve: Overcurrent protection for sensitive equipment (computers, electronic devices, etc.). Magnetic release operates between 3.2 and 4.8. (between 3.2 and 6.8 for dc)
- C curve: Overcurrent protection for all application types. Magnetic release operates from 7 to 10 times ampere rating. (between 7 and 14 for dc)
- D curve: Overcurrent protection for loads with high inrush currents (motors, transformers). Magnetic release operates between 10 and 14 times ampere rating. (no dc rating)
- Allows locking in O-OFF position using padlock attachment.
- Suitable for reverse feeding.

For rating and dimensional information, see Table 3, “Specifications for UL 1077 Recognized Supplementary Protectors”

Catalog Numbers

Table 14: Catalog Numbers for UL 1077 Recognized C60 Supplementary Protectors

Rating	B Curve				C Curve				D Curve			
	1P	2P	3P	4P	1P	2P	3P	4P	1P	2P	3P	4P
0.5 A	—	—	—	—	MG17411	—	—	—	MG17421	—	—	—
1 A	MG24110	MG24125	MG24140	MG24155	MG24425	MG24442	MG24459	MG24476	MG24500	MG24516	MG24532	MG24548
1.2 A	MG17402	MG17432	—	—	MG17412	MG17442	—	—	MG17422	MG17452	—	—
1.5 A	MG17403	MG17433	—	—	MG17413	MG17443	—	—	MG17423	MG17453	—	—
2 A	MG24111	MG24126	MG24141	MG24156	MG24426	MG24443	MG24460	MG24477	MG24501	MG24517	MG24533	MG24549
3 A	MG24112	MG24127	MG24142	MG24157	MG24427	MG24444	MG24461	MG24478	MG24502	MG24518	MG24534	MG24550
4 A	MG24113	MG24128	MG24143	MG24158	MG24428	MG24445	MG24462	MG24479	MG24503	MG24519	MG24535	MG24551
5 A	MG17404	MG17434	—	—	MG17414	MG17444	—	—	MG17424	MG17454	—	—
6 A	MG24114	MG24129	MG24144	MG24159	MG24430	MG24447	MG24464	MG24481	MG24504	MG24520	MG24536	MG24552
7 A	MG17405	MG17435	—	—	MG17415	MG17445	—	—	MG17425	MG17455	—	—
8 A	MG24115	MG24130	MG24145	MG24160	MG24431	MG24448	MG24465	MG24482	MG24505	MG24521	MG24537	MG24553
10 A	MG24116	MG24131	MG24146	MG24161	MG24432	MG24449	MG24466	MG24483	MG24506	MG24522	MG24538	MG24554
13 A	MG24117	MG24132	MG24147	MG24162	MG24433	MG24450	MG24467	MG24484	MG24507	MG24523	MG24539	MG24555
15 A	MG17406	MG17436	MG17461	—	MG17416	MG17446	MG17466	—	MG17426	MG17456	MG17471	—
16 A	MG24118	MG24133	MG24148	MG24163	MG24434	MG24451	MG24468	MG24485	MG24508	MG24524	MG24540	MG24556
20 A	MG24119	MG24134	MG24149	MG24164	MG24435	MG24452	MG24469	MG24486	MG24509	MG24525	MG24541	MG24557
25 A	MG24120	MG24135	MG24150	MG24165	MG24436	MG24453	MG24470	MG24487	MG24510	MG24526	MG24542	MG24558
30 A	MG17407	MG17437	MG17462	—	MG17417	MG17447	MG17467	—	MG17427	MG17457	MG17472	—
32 A	MG24121	MG24136	MG24151	MG24166	MG24437	MG24454	MG24471	MG24488	MG24511	MG24527	MG24543	MG24559
35 A	MG17408	MG17438	MG17463	—	MG17418	MG17448	MG17468	—	MG17428	MG17458	MG17473	—
40 A	MG24122	MG24137	MG24152	MG24167	MG24438	MG24455	MG24472	MG24489	MG24512	MG24528	MG24544	MG24560
50 A	MG24123	MG24138	MG24153	MG24168	MG24439	MG24456	MG24473	MG24490	MG24513	MG24529	MG24545	MG24561
60 A	MG17409	MG17439	MG17464	—	MG17419	MG17449	MG17469	—	MG17429	MG17459	MG17474	—
63 A	MG24124	MG24139	MG24154	MG24169	MG24440	MG24457	MG24474	MG24491	MG24514	MG24530	MG24546	MG24562

Section 3—IEC 60947-2 Rated Protection Devices

The Multi 9 system includes several families of miniature circuit protection devices that have the IEC ratings that are applicable in many countries other than the United States. These products are summarized below and discussed in more detail in the following pages. UL Listed and UL Recognized protection devices are described in Section 2, while accessories for both UL Listed and IEC Certified products are described in Section 5.

Table 15: Specifications for IEC Rated Miniature Circuit Breakers

Ratings per IEC 60947-2		DPN-N	C60N		C60H		C60L				C120H, NC125H	
Number of Poles		1 (Ø + N)	1	2, 3, 4	1	2, 3, 4	1	2, 3, 4			1	2, 3, 4
Rated Current 25°C (77°F) I_n		1–40 A	0.5–63 A	0.5–63 A	0.5–63 A	0.5–63 A	0.5–63 A	0.5–25 A	32–40 A	50–63 A	—	—
Rated Current (A) 40°C (104°F) I_n		—	—	—	—	—	—	—	—	—	10–125	10–125
Rated Voltage U_e		230 V	440 V	440 V	440 V	440 V	440 V	440 V	440 V	440 V	440 V	440 V
Ultimate Breaking Capacity (I_{cu}) as per IEC 60947-2 Standard	130 Vac	—	—	—	30 kA	—	—	—	—	—	30 kA	—
	230–240 Vac	7.5 kA	10 kA	20 kA	15 kA	30 kA	25 kA	50 kA	40 kA	30 kA	15 kA	30 kA
	400–415 Vac	2 ¹ kA	3 ¹ kA	10 kA	4 ¹ kA	15 kA	6 ¹ kA	25 kA	20 kA	15 kA	4 ¹ kA	15 kA
	440 Vac	—	—	6 kA	—	10 kA	—	20 kA	15 kA	10 kA	—	10 kA
	1P 60 Vdc	—	15 kA	—	20 kA	—	25 kA	—			—	—
	2P 125 Vdc	—	—	2P 20 kA	—	2P 25 kA	—	2P 30 kA			—	—
		—	—	3P 30 kA	—	3P 40 kA	—	3P 50 kA			—	—
	3P 250 Vdc	—	—	4P 40 kA	—	4P 50 kA	—	4P 60 kA			—	—
Service Breaking Capacity	I_{cs} (% I_{cu})	50%	75%	75%	50%	50%	50%			—	75%	75%
Magnetic Trip Curves	B Curve	3–5	3–5		3–5		3.2–4.8				3.2–4.8	
	C Curve	7–10	7–10		7–10		7–10				7–10	
	D Curve	—	10–14		10–14		10–14				10–14	
	K Curve	—	—		—		10–14				—	
	MA Curve	—	—		—		12				—	
	Z Curve	—	—		—		2.4–3.6				—	

¹ Single pole breaking capacity for IT type European grounding system (insulated neutral-double fault).

Table 16: Dimensions and Weights

Device	Size	Height		Width		Depth		Weight	
		in.	mm	in.	mm	in.	mm	oz.	g
DPN-N	1P	3.19	81	0.71	18	3.00	76	4.23	120
C60N	1P	3.19	81	0.71	18	3.00	76	3.88	110
	2P	3.19	81	1.42	36	3.00	76	7.75	220
	3P	3.19	81	2.13	54	3.00	76	11.64	330
	4P	3.19	81	2.48	72	3.00	76	15.52	440
C60H	1P	3.19	81	0.71	18	3.00	76	4.23	120
	2P	3.19	81	1.42	36	3.00	76	8.47	240
	3P	3.19	81	2.13	54	3.00	76	12.70	360
	4P	3.19	81	2.48	72	3.00	76	16.93	480
C60L	1P	3.19	81	0.71	18	3.00	76	4.23	120
	2P	3.19	81	1.42	36	3.00	76	8.47	240
	3P	3.19	81	2.13	54	3.00	76	12.70	360
	4P	3.19	81	2.48	72	3.00	76	16.93	480
C120H/NC125H	1P	3.19	81	0.71	27	3.00	76	6.35	180
	2P	3.19	81	2.13	54	3.00	76	12.70	360
	3P	3.19	81	3.19	81	3.00	76	19.05	540
	4P	3.19	81	4.25	108	3.00	76	25.40	720

DPN-N Phase + Neutral Circuit Breakers



The DPN-N Phase + Neutral Current Circuit Breaker provides phase and neutral protection against short-circuits and overloads. It provides protection on the phase pole, but switches both the phase and neutral. The DPN-N is available in only one version—1 phase + neutral. The DPN-N circuit breaker is available with B or C trip curve characteristics and with ratings from 1 to 40 A.

Table 17: Specifications for DPN-N Phase + Neutral Circuit Breakers

Package size:	Two 0.35 in. (9 mm) Modules	0.71 in. (18 mm) Width
Connection:	8 AWG (10 mm ²) Stranded Cables	
	6 AWG (16 mm ²) Solid cable (Copper Only)	
Mounting: 35 mm DIN rail	Mounting: 35 mm DIN Rail	
Degree of Protection	Case	IP40 as per IEC 529
	Terminals	IP20
Temperature	Calibration	86°F (30°C)
	Storage	40 to 176°F (-40 to 80°C)
	Operating	22 to 158°F (-30 to 70°C)
Tropicalization	Treatment 2	Relative Humidity: 95% at 131°F (55°C) as per IEC 68-2-30
Number of Operating Cycles	Mechanical	20,000 (O-C)
	Electrical	20,000 at 1-20 A
		15,000 at 25 A
		10,000 at 32 A
		6,000 at 40 A

See selection table for dimensions, weights and interrupting ratings

Time/Current Curves

B curve—Provides control and protection against overcurrents for very long cables. Magnetic trip units operate between 3 and 5 times ampere rating.

C curve—Provides control and protection against circuit overcurrents in tertiary and industrial final distribution with TT or TNS grounding systems. Magnetic trip units operate between 5 and 10 times ampere rating.

Accessories

These devices may be used in conjunction with the C60 electrical accessories, including the SD alarm switch, OF auxiliary switch, MN undervoltage release, and/or the MX + OF shunt trip and auxiliary switch.

Standards

- IEC 60947-2
- IEC 60898

Catalog Numbers

Table 18: Catalog Numbers for DPN-N Phase + Neutral Circuit Breakers

Rating	B Curve	C Curve	Rating	B Curve	C Curve
	1P + Neutral	1P + Neutral		1P + Neutral	1P + Neutral
1 A	—	19260	16 A	19254	19268
2 A	—	19261	20 A	19255	19269
4 A	19249	19263	25 A	19256	19270
6 A	19250	19264	32 A	19257	19271
10 A	19252	19266	40 A	19258	19272

IEC Rated C60 Miniature Circuit Breakers

The C60 family of Multi 9 circuit breakers meeting IEC 60947-2 is available primarily for equipment for export from the United States to countries requiring IEC Certification rather than UL Listing.

Three types of IEC Rated C60 devices are available: C60N, C60H, and C60L circuit breakers. These model numbers refer to the maximum current interrupting (Ultimate Breaking Capacity) ratings, see Table 15 on page 25.

Each of these devices is available with several characteristic trip curve ratings, as listed in the tables with catalog numbers. They include devices ranging from 0.5 to 63 A. (For higher current ratings, select devices from the higher current C120 series.)

Table 19: Specifications for IEC Rated C60 Miniature Circuit Breakers

High Voltage Withstand	6 kV	
Connections (Box Lug) for C60N/H/L Except C60L-MA ¹	0.5–25 A, 18–4 AWG (1–25 mm ²) Cu Only Cables	Torque to 22 lb-in (2.5 N•m)
	30–63 A, 18–2 AWG (1–35 mm ²) Cu Only Cables	Torque to 31 lb-in (3.5 N•m)
Connections for C60L-MA:	1.5–10 A Stranded 6 AWG (16 mm ²)	Torque to 35 lb-in (4 N•m)
	1.5–10 A Solid 4 AWG (25 mm ²)	Torque to 18 lb-in (2 N•m)
	12.5–40 A Stranded 4 AWG (25 mm ²)	Torque to 35 lb-in (4 N•m)
	12.5–40 A Solid 2 AWG (35 mm ²)	Torque to 31 lb-in (3.5 N•m)
Mounting	35 mm DIN rail	
Time-Current Curves	B, C, D, K, and MA	
Degree of Protection	Case	IP40 as per IEC 529
	Terminals	IP20
Temperature:	Calibration temperature: 30°C (86°F)	C60L calibrated at 40°C (104°F)
	Storage temperature	-40 to 80°C (-40 to 176°F)
	Operating temperature	-30 to 70°C (-22 to 158°F)
Tropicalization	Treatment 2	Relative Humidity: 95% at 131°F (55°C) per IEC 68-2-30
Number of Operating Cycles	Mechanical (O-C)	20,000
	Electrical (O-C)	10,000

See selection table for dimensions, weights and interrupting ratings

¹ Ring tongue terminal is optional

Standard Features

- Fast closing: Allows increased withstand to the high inrush currents of some loads
- Trip-free mechanism: Contacts cannot be held in the I-ON position when the C60 device is tripped automatically.
- Positive indication of contact disconnect. Green mechanical indication on front face of device shows that all poles are open.
- Suitable for reverse feeding.
- B curve: Overcurrent protection for sensitive equipment (computers, electronic devices, etc.):
 - C60N/H: The magnetic release operates between 3 and 5 times ampere rating.
- C curve: Overcurrent protection for all application types:
 - C60N/H: The magnetic release operates between 5 and 10 times ampere rating.
 - C60L: The magnetic release operates between 7 and 10 times ampere rating.
- D and K curves: Overcurrent protection for loads with high inrush currents (motors, transformers):
 - C60N/H/L: The magnetic release operates between 10 and 14 times ampere rating.
- MA curve: C60L-MA circuit breakers are designed for motor circuit protection against short circuits. These circuit breakers are equipped with magnetic-only trip units at 12 times ampere rating. Therefore they must be combined with a suitable thermal protection device.

Multi 9™ System Catalog

Section 3—IEC 60947-2 Rated Protection Devices

Standards

- IEC 60947-2
- VDE 0660
- CE Marked

Catalog Numbers

Table 20: Catalog Numbers for IEC 60947-2 Rated C60N Miniature Circuit Breakers

Rating	B Curve				C Curve				D Curve			
	1P	2P	3P	4P	1P	2P	3P	4P	1P	2P	3P	4P
0.5 A	—	—	—	—	24067	24068	24069	24070	—	—	—	—
1 A	24045	24071	24084	24097	24395	24331	24344	24357	24625	24653	24667	24681
2 A	24046	24072	24085	24098	24396	24332	24345	24358	24626	24654	24668	24682
3 A	24047	24073	24086	24099	24397	24333	24346	24359	24627	24655	24669	24683
4 A	24048	24074	24087	24100	24398	24334	24347	24360	24628	24656	24670	24684
6 A	24049	24075	24088	24101	24399	24335	24348	24361	24629	24657	24671	24685
10 A	24050	24076	24089	24102	24401	24336	24349	24362	24630	24658	24672	24686
16 A	24051	24077	24090	24103	24403	24337	24350	24363	24632	24660	24674	24688
20 A	24052	24078	24091	24104	24404	24338	24351	24364	24633	24661	24675	24689
25 A	24053	24079	24092	24105	24405	24339	24352	24365	24634	24662	24676	24690
32 A	24054	24080	24093	24106	24406	24340	24353	24366	24635	24663	24677	24691
40 A	24055	24081	24094	24107	24407	24341	24354	24367	24636	24664	24678	24692
50 A	24056	24082	24095	24108	24408	24342	24355	24368	24637	24665	24679	24693
63 A	24057	24083	24096	24109	24409	24343	24356	24369	24638	24666	24680	24694

Table 21: Catalog Numbers for IEC 60947-2 Rated C60H Miniature Circuit Breakers

Rating	B Curve				C Curve				D Curve			
	1P	2P	3P	4P	1P	2P	3P	4P	1P	2P	3P	4P
0.5 A	—	—	—	—	24900	24902	24906	24908	25171	25172	25173	25174
0.75 A	—	—	—	—	24901	24903	24907	24909	—	—	—	—
1 A	—	—	—	—	24968	24981	24994	25007	25152	25183	25196	25211
2 A	—	—	—	—	24969	24982	24995	25008	25155	25184	25197	25212
3 A	—	—	—	—	24970	24983	24996	25009	25157	25185	25198	25213
4 A	—	—	—	—	24971	24984	24997	25010	25158	25186	25199	25214
6 A	24643	24725	24738	24751	24972	24985	24998	25011	25159	25187	25200	25215
10 A	24644	24726	24739	24752	24973	24986	24999	25012	25160	25188	25201	25216
13 A	24645	—	—	—	—	—	—	—	—	—	—	—
16 A	24646	24727	24740	24753	24974	24987	25000	25013	25161	25189	25202	25217
20 A	24647	24728	24741	24754	24975	24988	25001	25014	25164	25190	25203	25218
25 A	24648	24729	24742	24755	24976	24989	25002	25015	25165	25191	25205	25219
32 A	24649	24730	24743	24756	24977	24990	25003	25016	25166	25192	25207	25220
40 A	24650	24731	24744	24757	24978	24991	25004	25017	25167	25193	25208	25221
50 A	24651	24732	24745	24758	24979	24992	25005	25018	25168	25194	25209	25222
63 A	24652	24733	24746	24759	24980	24993	25006	25019	25169	25195	25210	25223

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Table 22: Catalog Numbers for IEC 60947-2 Rated C60L Miniature Circuit Breakers

Rating	B Curve				C Curve				K Curve			
	1P	2P	3P	4P	1P	2P	3P	4P	1P	2P	3P	4P
0.5 A	—	—	—	—	25406	25407	25408	25409	—	—	—	—
1 A	—	—	—	—	25392	25418	25431	25444	25460	25478	25496	25514
1.6 A	—	—	—	—	—	—	—	—	25461	25479	25497	25515
2 A	—	—	—	—	25393	25419	25432	25445	25462	25480	25498	25516
3 A	—	—	—	—	25394	25420	25433	25446	25463	25481	25499	25517
4 A	—	—	—	—	25395	25421	25434	25447	25464	25482	25500	25518
6 A	25331	25357	25370	25383	25396	25422	25435	25448	25465	25483	25501	25519
10 A	25332	25358	25371	25384	25397	25423	25436	25449	25467	25485	25503	25521
16 A	25333	25359	25372	25385	25398	25424	25437	25450	25468	25486	25504	25522
20 A	25334	25360	25373	25386	25399	25425	25438	25451	25469	25487	25505	25523
25 A	25335	25361	25374	25387	25400	25426	25439	25452	25470	25488	25506	25524
32 A	25336	25362	25375	25388	25401	25427	25440	25453	25471	25489	25507	25525
40 A	25337	25363	25376	25389	25402	25428	25441	25454	25472	25490	25508	25526
50 A	25338	25364	25377	25390	25403	25429	25442	25455	—	—	—	—
63 A	25339	25365	25378	25391	25404	25430	25443	25456	—	—	—	—

Coordination of C60L-MA Circuit Breaker, Thermal Relay and Contactor

Standard IEC 60947-4 defines tests at various current levels with the aim of placing the switchgear in extreme conditions. According to the status of components after testing, the standard defines two types of coordination.

Table 23: Definition of IEC Type 1 and Type 2 Coordination

Types of Coordination	Type 1	Type 2
Deterioration of the contactor and relay is accepted under two conditions	- There is no risk to the operator - Parts other than the contactor and relay must not be damaged	- Welding of the contactor or starter contacts is accepted only if they can be easily separated - After Type 2 coordination tests, the functions of protection and operation can be achieved
The choice of coordination type depends on the operating parameters. It must be suitable for the user's needs and ensure optimized cost of the installation	- Qualified maintenance service - Reduced volume and cost of equipment - Continuity of service not required or ensured by replacing the faulty motor bucket	- Continuity of service is vital - Reduced maintenance service - Specification calling for Type 2 coordination - Various thermal relay classes: Thermal relay class must be appropriate for motor starting time

The magnetic release of MA devices operates at 12 times ampere rating. These C60L-MA circuit breakers are listed in Table 24.

Table 24: Catalog Numbers for IEC 60947-2 Rated C60L MA Curve Miniature Circuit Breakers

Rating	MA Curve			
	1P	2P	3P	4P
1.6 A	—	26345	26357	—
2.5 A	—	26346	26358	—
4 A	—	26347	26359	—
6.3 A	—	26348	26360	—
10 A	—	26349	26361	—

Rating	MA Curve			
	1Ps	2P	3P	4P
12.5 A	—	26350	26362	—
16 A	—	26352	26368	—
25 A	—	26353	26369	—
40 A	—	26355	26370	—

Table 25: Tripping Times

Class	Tripping Time (sec.) at 7.2 I _r
10 A	2–10
20 A	6–20

IEC Rated C120H Circuit Breakers

The IEC Rated C120H family of Multi 9 circuit breakers meets the requirements of IEC 947-2 and are available for OEMs wishing to export manufactured products to countries requiring IEC Certification instead of UL Listing.

They are suitable for protection of cables against overloads and short circuits in equipment. They can also be used for manual control and isolation of circuits.

The C120H circuit breakers are available in B, C, and D trip curves, as listed in Table 28. They include devices ranging from 10 to 125 A. (For lower current ratings, select devices from the C60 series.)



Table 26: IEC 947-2 Rated C120H Circuit Breakers

Table 27: Specifications for IEC Rated C120H Circuit Breakers

Package Size	Three 9 mm Modules	27 mm Width per Pole
Voltage	High Voltage Withstand	6 kV
	Maximum Voltage Rating	440 Vac
Connection: Box Lug, 10–100 A	18 to 1 AWG (1–50 mm ²) Cables	Cu Wire Only
Mounting	35 mm DIN Rail	
Degree of Protection:	Case	IP40 as per IEC 60529
	Terminals	IP20
Time/Current Curves	B, C and D Curves	
Temperature:	Calibration	30°C (85°F)
	Storage	-40 to 80°C (-40 to 176°F)
	Operating	-30 to 70°C (-22 to 158°F)
Tropicalization	Treatment 2	Relative Humidity: 95% at 55°C (131°F) as per IEC 68-2-30
Number of Operating Cycles	1000 (O-C) at 63 A	
	5000 (O-C) at 80–125 A	
See Table 15 for dimensions, weights and interrupting ratings		

Standard Features

- Fast closing: Allows increased withstand to the high inrush currents of some loads
- Trip-free mechanism: Contacts cannot be held in I-ON position when C120 is tripped automatically.
- Isolation with positive break indication: Green strip on operating handle indicates all poles are open
- Terminals ensure pull-out withstand of cables, guiding of cables into correct position, and tightening of wide cross-section cables.
- B curve: Overcurrent protection of very long cables and protection of networks supplied by generators. The magnetic release operates between 3 and 5 times ampere rating.
- C curve: Overcurrent protection for all application types. The magnetic release operates between 5 and 10 times ampere rating.
- D curve: Overcurrent protection for loads with high inrush currents (motors, transformers). The magnetic release operates between 10 and 14 times ampere rating.
- Suitable for reverse feeding.

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Section 3—IEC 60947-2 Rated Protection Devices

Accessories

Ground-fault protection can be provided when combined with a Vigi C120 module. Remote tripping and indication can be provided by adding a variety of auxiliaries (see section 5 for accessories).

NOTE: The C120 circuit breakers use the same electrical auxiliaries as the C60 circuit breakers. They do not accept the NC100H circuit breaker accessories.

Standards

- IEC 60947-2
- VDE 0660
- CE Marked

Catalog Numbers

Table 28: Catalog Numbers for Multi 9 C120H (10–125 A) Circuit Breakers—15 kA at 240 Vac

	Rating	1P	2P	3P	4P
	B Curve (Magnetic Setting Between 3 and 5 Times Ampere Rating)				
	10 A	18394	18405	18416	18427
	16 A	18395	18406	18417	18428
	20 A	18396	18407	18418	18429
	25 A	18397	18408	18419	18430
	32 A	18398	18409	18420	18431
	40 A	18399	18410	18421	18432
	50 A	18400	18411	18422	18433
	63 A	18401	18412	18423	18434
	80 A	18402	18413	18424	18435
	100 A	18403	18414	18425	18436
	125 A	18404	18415	18426	18437
	C Curve (Magnetic Setting Between 5 and 10 Times Ampere Rating)				
	10 A	18438	18449	18460	18471
	16 A	18439	18450	18461	18472
	20 A	18440	18451	18462	18473
	25 A	18441	18452	18463	18474
	32 A	18442	18453	18464	18475
	40 A	18443	18454	18465	18476
	50 A	18444	18455	18466	18477
	63 A	18445	18456	18467	18478
	80 A	18446	18457	18468	18479
	100 A	18447	18458	18469	18480
	125 A	18448	18459	18470	18481
	D Curve (Magnetic Setting Between 10 and 14 Times Ampere Rating)				
	10 A	18482	18493	18504	18515
	16 A	18483	18494	18505	18516
	20 A	18484	18495	18506	18517
	25 A	18485	18496	18507	18518
	32 A	18486	18497	18508	18519
	40 A	18487	18498	18509	18520
	50 A	18488	18499	18510	18521
	63 A	18489	18500	18511	18522
	80 A	18490	18501	18512	18523
	100 A	18491	18502	18513	18524
	125 A	18492	18503	18514	18525
					
	10 A				
	16 A				
	20 A				
	25 A				
	32 A				
	40 A				
	50 A				
	63 A				
	80 A				
	100 A				
	125 A				

Section 4—Ground-Fault Protection Devices

Selection Table

The Multi 9 System includes one UL Listed and three IEC rated product families that provide ground-fault protection. These products are summarized below and discussed in more detail in the following pages.

Table 29: Selection Table for Multi 9 Ground-fault Protection Products

			GFP			ID		C60 Vigi™			
Standard			UL 1053 IEC 61008			IEC 61008		IEC 61009			
Number of Poles			2P	2P	4P	2P	4P	2P	2P	3P	4P
Rated Current (A) 25°C (77°F)		I_n Pickup	—	—	—	25–100	25–100	< 63	< 63	< 63	< 63
Sensitivities	Instantaneous	10 mA	—	—	—	Yes	—	—	Yes	—	—
		30 mA	25–63	25–63	25–63	Yes	Yes	Yes	Yes	Yes	Yes
		100 mA	25–63	25–63	25–63	—	—	—	—	—	—
		300 mA	25–100	25–100	25–100	Yes	—	Yes	—	—	—
		500 mA	—	—	—	—	—	—	—	—	—
	Selective	300 $\square^1$	—	—	—	Yes	Yes	—	Yes	Yes	Yes
		500 $\square^1$	—	—	—	—	—	—	—	—	—
		1000 $\square^1$	—	—	—	—	—	—	Yes	Yes	Yes
Voltage (Nominal) Vac, 50-60 Hz			120, 240	277, 480Y	240, 480Y/277	240/415		130	240/415		
Time/Current Curve			Depends on Circuit Breaker Used.								
Dimensions (in./mm)		Width	1.42 (36)	1.42 (36)	2.84 (72)	1.42 (36)	2.84 (72)	1.42 (36)	1.42 (36)	2.13 (54)	12.84 (72)
		Height	3.19 (81)	3.19 (81)	3.19 (81)	3.19 (81)	3.19 (81)	3.19 (81)	3.19 (81)	3.19 (81)	3.19 (81)
		Depth	3.00 (76)	3.00 (76)	3.00 (76)	3.00 (76)	3.00 (76)	3.00 (76)	3.00 (76)	3.00 (76)	3.00 (76)
Weight (oz./g)			7.70/ 220	7.70/ 220	15.9/ 450	7.70/ 220	15.9/ 450	2.43/ 120	5.29/ 150	< 25 = 6.35 /180 > 63 = 7.41/210	

¹ $\square$ Selective = has non-adjustable time delay to allow selective coordination

Table 30: Overcurrent Protection Required for UL Applications of GFP

GFP	C60 Circuit Breaker				
	25 A, 240 Vac		20 A, 277 Vac	20 A, 480Y/277 Vac	
	1P and 2P	3 P	1P	2P	3P
2P 240 Vac	10	—	—	—	—
2P 480Y/277 Vac	—	—	10	10	—
4P 480Y/277 Vac	—	10	—	—	10

UL 1053 Listed GFP Ground Fault Protectors



The GFP Ground Fault Protector provides ground fault protection for electrical circuits. It will automatically open the circuit in the case of a ground fault between phase and ground greater than 10, 30 or 300 mA, depending on the model. An electromechanical release operates without any auxiliary source of supply to open the circuit. The GFP is available in 2-pole and 4-pole (3 or 4-wire) versions.

NOTE: The GFP has only one protective function—detection of ground fault current. There is no thermal or magnetic overcurrent protection. Therefore, the circuit must be protected upstream by an approved device such as the Multi 9 C60, QOU, QO, or HGL circuit breaker, or a fuse.

Multi 9 GFP products contain *Si* technology to increase immunity to noise and to minimize the potential for nuisance tripping in noisy electrical environments.

The toggle on the front of the GFP is used to reset the device after it has tripped. It should not be used to switch loads. A test button located on the front of the GFP is provided to allow periodic testing of the device. The tripped condition due to ground fault is displayed on the front face by a red mechanical indicator.

Remote monitoring and control can be provided with optional C60 accessories including the OF Auxiliary Switch, SD Alarm Switch, MN Undervoltage Release and/or MX + OF Shunt Trip.

NOTE: These auxiliaries require the use of the OFS Auxiliary Switch (Cat. No. 26923) to adapt to the ID Residual Current Switch.

Table 31: Specifications for UL 1053 Listed GFP Ground Fault Protectors

Voltage Rating	Two Poles at 120 or 240 Vac (-15/+10%) Two Poles at 277 or 480Y/277 Vac (-15/+10%) Four Poles at 240 Vac or 480Y/277 Vac (-15/+10%)	
Current Rating (40°C)	25 A, 40 A, 63 A, 80 A or 100 A	Depending on Catalog Number
Ground Fault Sensitivity:	GFP30	Must Trip at 29.9 mA; Must Not Trip Below 22.1 mA
	GFP100	Must Trip at 98.9 mA; Must Not Trip Below 73.1 mA
	GFP300	Must Trip at 299 mA; Must Not Trip Below 221 mA
Short-Circuit Current Rating	10 kA with Recommended Circuit Breaker or Fuse Upstream	See bulletin GHA1080850AB
Frequency	50 or 60 Hz.	
Mounting	35 mm DIN rail	
Connection, Box Lug	Wire: 75°C copper wire only, stranded or solid 14 to 2 AWG (2.5 to 35 mm ²)	Torque to 31 lb-in (3.5 N•m)
Padlocking in the "Tripped" Position is Possible	Use a Padlocking Device	Requires Addition of OFS on Left Side of Circuit Breaker plus Padlocking Attachment M9PAFL
Ground-Fault Indication	Red Indicator Flag on Front Face	
Temperature	Operating Temperature	-25 to +60°C (-13 to +140°F)
	Storage Temperature	-40 to +70°C (-40 to + 158°F)
Tropicalization	Treatment 2	Relative humidity 95% at 55°C (131°F)
See Table 29 for dimensions and weights		

Standards

- UL 1053 (not CSA certified)
- IEC 61008
- CE Marked

Section 4—Ground-Fault Protection Devices

Catalog Numbers

Table 32: Catalog Numbers for UL Rated GFP Ground Fault Protectors

Poles	Voltage	Current	Maximum Sensitivity	Tripping Range	Family	Catalog Number
2P	UL 1053 120/240 V, 240 V 60 Hz	25 A	30 mA 100 mA 300 mA	22.1 to 29.9 mA 73.1 to 98.9 mA 221 to 299 mA	GFP 30 GFP 100 GFP 300	60949 60950 60951
		40 A	30 mA 100 mA 300 mA	22.1 to 29.9 mA 73.1 to 98.9 mA 221 to 299 mA	GFP 30 GFP 100 GFP 300	60952 60953 60954
	IEC 61008 230 V, 240 V 50 Hz	63 A	30 mA 100 mA 300 mA	22.1 to 29.9 mA 73.1 to 98.9 mA 221 to 299 mA	GFP 30 GFP 100 GFP 300	60955 60956 60957
		80 A	300 mA	221 to 299 mA	GFP 300	60958
		100 A	300 mA	221 to 299 mA	GFP 300	60959
	2P	UL 1053 277 V, 480Y/277 V 60 Hz	25 A	30 mA 100 mA 300 mA	22.1 to 29.9 mA 73.1 to 99.9 mA 221 to 299 mA	GFP 30 GFP 100 GFP 300
40 A			30 mA 100 mA 300 mA	22.1 to 29.9 mA 73.1 to 98.9 mA 221 to 299 mA	GFP 30 GFP 100 GFP 300	60972 60973 60974
IEC 61008 230/400 V, 240/415 V 50 Hz		63 A	30 mA 100 mA 300 mA	22.1 to 29.9 mA 73.1 to 8.9 mA 221 to 299 mA	GFP 30 GFP 100 GFP 300	60975 60976 60977
		80 A	300 mA	221 to 299 mA	GFP 300	60978
		100 A	300 mA	221 to 299 mA	GFP 300	60979
4P		UL 1053 240 V, 480Y/277 V 60 Hz	25 A	30 mA 100 mA 300 mA	22.1 to 29.9 mA 73.1 to 98.9 mA 221 to 299 mA	GFP 30 GFP 100 GFP 300
	40 A		30 mA 100 mA 300 mA	22.1 to 29.9 mA 73.1 to 98.9 mA 221 to 299 mA	GFP 30 GFP 100 GFP 300	60992 60993 60994
	IEC 61008 230/400 V, 240/415 V 50 Hz	63 A	30 mA 100 mA 300 mA	22.1 to 29.9 mA 73.1 to 98.9 mA 221 to 299 mA	GFP 30 GFP 100 GFP 300	60995 60996 60997
		80 A	300 mA	221 to 299 mA	GFP 300	60998
		100 A	300 mA	221 to 299 mA	GFP 300	60999

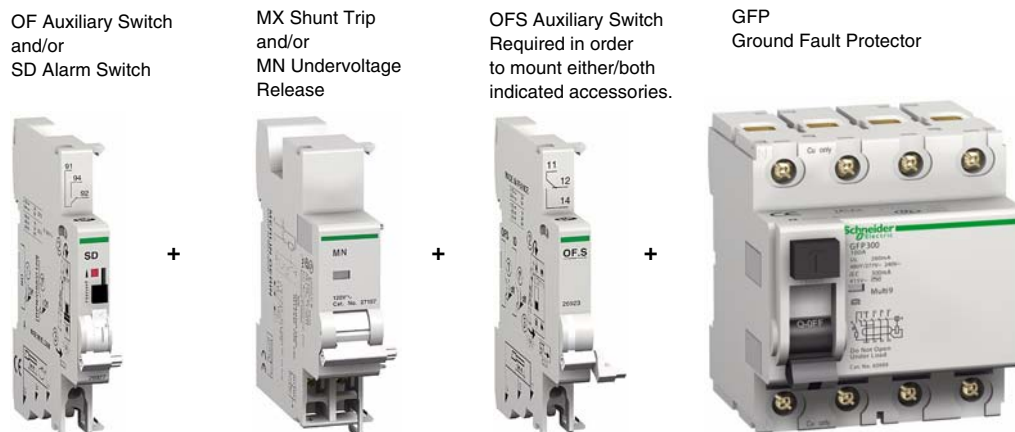


Figure 7: Possible Device Combinations

IEC Rated ID Residual Current Switches

The ID Residual Current Switches provide ground fault protection for electrical circuits, as well as the functions of isolation and switching. ID switches have an electromechanical release that opens a circuit automatically in the case of a fault between phase and earth greater than 10, 30, or 300 mA, depending on the model. The switch operates without the need for an auxiliary source of power. A version with time delay (selective) provides non-adjustable time delay for coordination with downstream instantaneous residual current devices. The ID Switch is available in 2 pole (1 phase) and 4 pole (3 phase) versions.

The ground fault is displayed on the front face by a red mechanical indicator.

NOTE: The ID residual current switch has only one protective function—detection of earth leakage current. There is no thermal or magnetic overcurrent protection. Therefore, the circuit must be protected by an upstream circuit breaker or supplementary protector. For combined overcurrent and residual current protection, an alternative is a C60 circuit breaker equipped with an auxiliary Vigi™ ground-fault detector module.

The ID device can also be manually operated as a switch. Remote monitoring and control can be provided with optional C60 accessories including the OF Auxiliary Switch, SD Alarm Switch, MN Undervoltage Release, and/or MX + OF Shunt Trip.

NOTE: All of these auxiliaries require the use of the OFS Auxiliary Switch (Cat. No. 26923) to adapt to the ID Residual Current Switch.

A test button provided on the front of the ID Residual Current Switch to allow periodic testing of the device.

Figure 8: IEC Rated ID Residual Current Switches

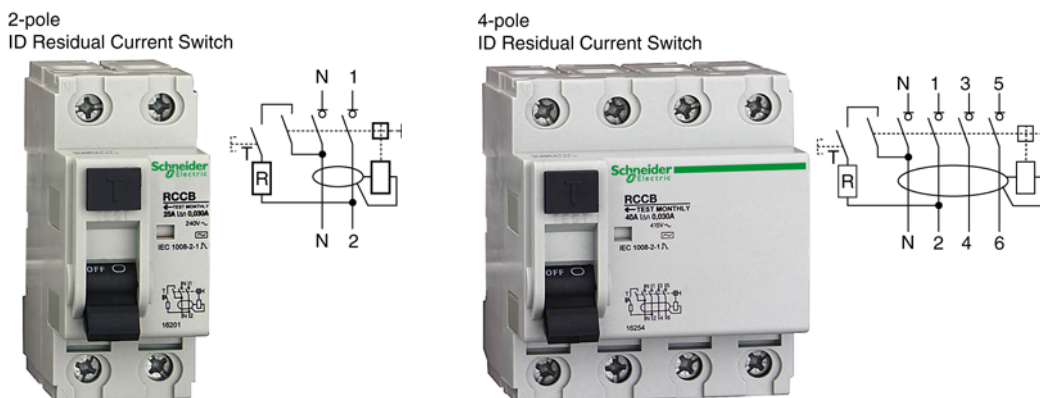


Table 33: Specifications for IEC Rated ID Residual Current Switches

Voltage	Nominal Voltage	240 to 415 Vac, +10%, -20%, 50/60 Hz
	High Voltage Withstand	6 kV
Connection, Box Lug	14–2 AWG (2.5–35 mm ²) Stranded Cables, Cu Wire Only	Torque to 31 lb-in (3.5 N•m)
	1 AWG (50 mm ²) Solid Cables, Cu Wire Only	Torque to 31 lb-in (3.5 N•m)
Sensitivities	Fixed at 10, 30, or 300 mA	
Time/Current Curve	Instantaneous or Selective Release S (Time Delay)	
Level of Immunity	250 A Peak	According to 8/20 ms Periodical Wave
Operating Temperature	-5 to 60°C (22 to 140°F)	
Tropicalization	Treatment 2	Relative Humidity: 95% at 55°C (131°F) per IEC 68-2-30
Mounting	35 mm DIN Rail	
Number of Operating Cycles	Electrical (O-C)	20,000
See Table 29 for weights, dimensions and interrupting ratings		

Multi 9™ System Catalog

Section 4—Ground-Fault Protection Devices

Standards

- IEC 61008
- CE Marked

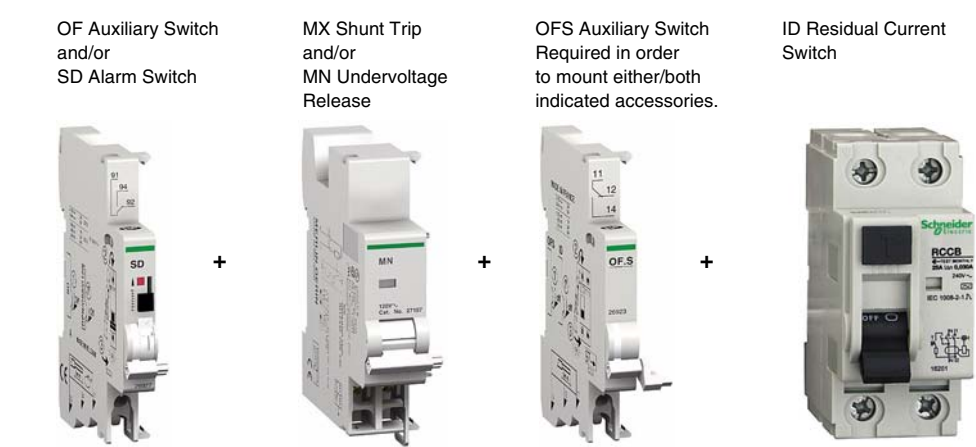
Catalog Numbers

Table 34: Catalog Numbers for IEC ID Residual Current Switches—AC Class

Rating	Sensitivity (mA)	2P (240 Vac) 4 Modules	4P (415 Vac) 8 Modules
25 A	10	16200	—
	30	16201	16251
40 A	30	16204	16254
	30	16208	16258
63 A	300  ¹	23028	16265
	30	16212	—
80 A	300  ¹	23032	16266
	300	23034	—
100 A	300  ¹	23035	23059
	300		

¹  Selective = has non-adjustable time delay to allow selective coordination

Figure 9: Possible Device Combinations



IEC Rated C60 Vigi™ Modules for Ground-fault Protection



The C60 Vigi residual current detector can be added to the C60 circuit breaker to provide a high level of protection against earth leakage faults. The Vigi module clips onto the right-hand side of a C60 protective device and is mechanically linked to the C60 circuit breaker, which it trips when the Vigi detects residual current. Vigi modules are available for use with 2-, 3-, and 4-pole C60 circuit breakers. The Vigi module may be field installed.

The Vigi module combines a current sensing toroid and residual current relay in one case and operates without an auxiliary power supply source. It may be ordered with a variety of non-adjustable sensitivities (10 to 1,000 mA). A version with time delay (selective) provides non-adjustable time delay for coordination with downstream instantaneous residual current devices.

A built-in filtering device minimizes nuisance tripping due to transient voltages (lightning, line disturbances, etc.) and transient currents (from high capacitive circuits).

A visual indicator of the ground fault is provided by a red flag on the Vigi operating handle. A manual test button on the face of the Vigi module allows manual testing of the Vigi module.

The C60 Vigi module can be field-adapted to reset in one of two modes: Automatic reset when the associated protective device handle is reset, or by manually resetting the Vigi prior to reclosing the supplementary protector.

A version with time delay (selective) provides additional time discrimination with downstream instantaneous residual current devices.

NOTE: The C60 version of the Vigi Module cannot be used with the C120 series. A different series of Vigi Modules is available for the C120 devices.

Figure 10: Example of Residual Current Circuit Breaker



NOTE: Also see the ID Residual Current Switches.

Table 35: Specifications for IEC Rated C60 Vigi Modules for Ground-Fault Protection

Voltage (Nominal):	130–240 Vac	+10/ -20%, 50/60 Hz
	220–415 Vac	+10/ -20%, 50/60 Hz
High Voltage Withstand: 6 kV	6 kV	
Connection: Box Lug:	≤ 25 Stranded 6 AWG (16 mm ²) Cu Wire	4 N•m
	≤ 25 Solid 6 AWG (16 mm ²) Cu Wire	2 N•m
	≤ 63 Stranded 6 AWG (16 mm ²) Cu Wire	4 N•m
	≤ 63 Solid 6 AWG (16 mm ²) Cu Wire	3.5 N•m
Mounting	35 mm DIN rail	
Time-Current Curves	Depends on Circuit Breaker	
Time/Current Curve	Instantaneous or Selective Release	
Sensitivities	Fixed at 10, 30, 300, or 1000 mA	
Temperatures	Calibration	77°F (25°C)
	Operating	22 to 140°F (-5 to 60°C)

See Table 29 on page 32 for weights, dimensions and interrupting ratings

Multi 9™ System Catalog
Section 4—Ground-Fault Protection Devices

Accessories

Terminal screw shields prevent contact with the Vigi™ module terminal screws. The bag includes twenty pieces of single-pole shields. (Cat. No. 26982).

Standards

Combined with C60, the Vigi module forms a residual current device which conforms to the following standards:

- IEC 61009
- EN 61009

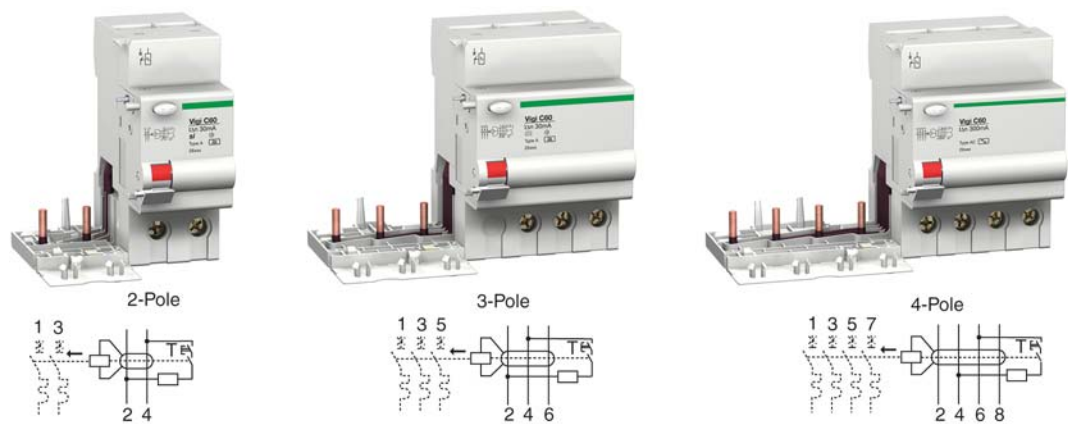
Catalog Numbers

Table 36: Catalog Numbers for Vigi C60 Modules—AC Class (Not UL/CSA Recognized)

Rating	Voltage	Sensitivity (mA)	2P	2P	3P	4P
≤25 A	130 Vac	30	26502			
		300	26503			
≤40 A	130 Vac	30		26504		
		300		26505		
≤63 A	130 Vac	30		26506		
		300		26507		
≤25 A	220–415 Vac	10	26580	—	—	—
		30	26581	—	—	—
≤63 A	220–415 Vac	30	—	26611	26620	26643
		300  ¹	—	26616	26631	26648
		1000  ¹	—	26618	26636	26650

¹  Selective = has non-adjustable time delay to allow selective coordination

Figure 11: IEC Rated C60 Vigi Modules



IEC Rated C120 Vigi™ Residual Current Circuit Breakers



The C120 Vigi residual current detector can be added to the C120 circuit breaker to provide a high level of protection against earth leakage faults. The Vigi module clips onto the right-hand side of a C120 protective device and is mechanically linked to the C120 circuit breaker, which it trips when the Vigi detects residual current.

The C120 circuit breaker and Vigi module combination is reset in a single operation by resetting the circuit breaker

The Vigi module combines a current sensing toroid and residual current relay in one case and operates without an auxiliary power supply source. It may be ordered with a variety of non-adjustable sensitivities (30 to 1,000 mA). A version with time delay (selective) provides additional time discrimination with downstream instantaneous residual current devices.

Vigi modules combine with the C120 2-, 3- and 4-pole circuit breakers to provide:

- Protection of people against indirect contact (per IEC Standards)
- Additional protection of people against direct contact (30 mA)
- Protection of electrical installations against insulation faults

The C120 circuit breaker and Vigi module combination is protected against nuisance tripping due to transient overvoltages such as lightning, switching on the network, etc.

Table 37: Specifications for IEC Rated C120 Vigi Residual Current Circuit Breakers

Current Rating	125 A	
Guarantees Tripping for Sinusoidal AC Residual Currents	Either Suddenly Applied or Slowly Increasing	
Total Vertical Discrimination with the $I_{\Delta n}$ 300 mA to 1 A [S] "Selective" Sensitivities if it is Installed:	Upstream From an instantaneous Residual Current Device	
	Downstream from an Index II, Time-Delayed Residual Current Device	Where in Both Cases the $I_{\Delta n}$ of the Downstream Device $\leq I_{\Delta n}/2$ of the Upstream Device
Connections	16–2 AWG (1–35 mm ²) Stranded Wire	31 lb-in (3.5 N•m)
	16–1 AWG (1–50 mm ²) Solid Wire	31 lb-in (3.5 N•m)
Voltage	220–415 Vac	+10%, -20%, 50/60 Hz
Mechanical Indication	Red Indicator	On Front Face of the Vigi Module
Instantaneous or Selective Tripping	Fixed Sensitivities for All Ratings	

See Table 29 on page 32 for weights and interrupting ratings

Standards

Complies with IEC 1009 Standard

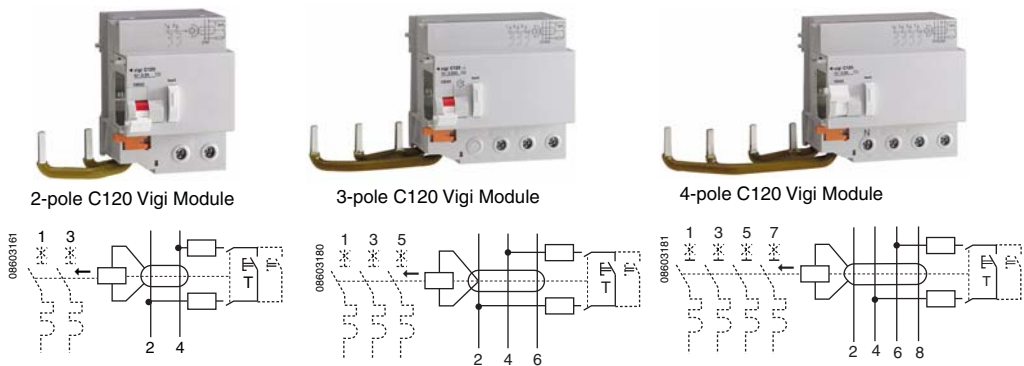
Catalog Numbers

Table 38: Catalog Numbers for IEC C120 Vigi S/ (Noise Immune) Module—AC Class

Rating	Voltage	Sensitivity (mA)	2P	3P	4P
125 A	220–415 Vac	30	18591	18594	18597
		300	18592	18595	18598
		300 [S] ¹	18556	18558	18560
		500	18593	18596	18599
		1000	18557	18559	18561

¹ [S] Selective = has non-adjustable time delay to allow selective coordination

Figure 12: IEC Rated C120 Vigi™ Modules



DPN-N Vigi Residual Current Circuit Breaker

Function



- The DPN N Vigi residual current device provides complete protection of final circuits (overcurrents and insulation faults):
 - protection of people against electric shocks by direct contacts (30 mA),
 - protection of people against electric shocks by indirect contacts (300 mA),
 - protection of installations from fire hazards (300 mA).
- Fast closing.
- Positive break indication.
- Display of earth fault on the front panel by position of toggle.
- The "si" range has been designed to maintain a network with optimum safety and continuity of service in installations disturbed by:
 - extreme atmospheric conditions,
 - harmonic generating loads,
 - transient operating currents.

Catalog Numbers

Table 39: DPN-N VIGI Residual Current Circuit Breaker

Rating (A)	1-pole + N (B Curve) 4 Modules		1-pole + N (C Curve) 4 Modules		Width in 9-mm Modules
	30 mA	300 mA	30 mA	300 mA	
4	19650	—	—	—	4
6	19651	19671	19661	19681	
10	19653	19673	19663	19683	
13	—	—	—	—	
16	19655	19675	19665	19685	4
20	19656	19676	19666	19686	
25	19657	19677	19667	19687	
32	19658	19678	19668	19688	
40	19659	19679	19669	19689	
Voltage Rating (Ue)	230 Vac				
Operating Frequency	50/60 Hz				

Standards

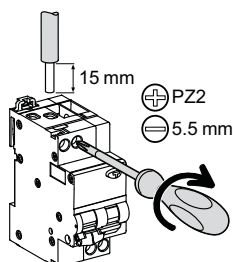
- European standard EN 61009.
- International standard IEC 61009.

Section 5—Accessories

The Multi 9 System includes an extensive line of field-installable accessories that enables the system to be used in many applications. Electrical auxiliaries include shunt trip, undervoltage release, auxiliary switch, and alarm switch. Control and display devices include push buttons, motor operators, and signal lamps. Also available is a variety of accessories for locking, operating, shielding, mounting, etc. Other devices include switches and timers. The following diagram shows many of the accessories.

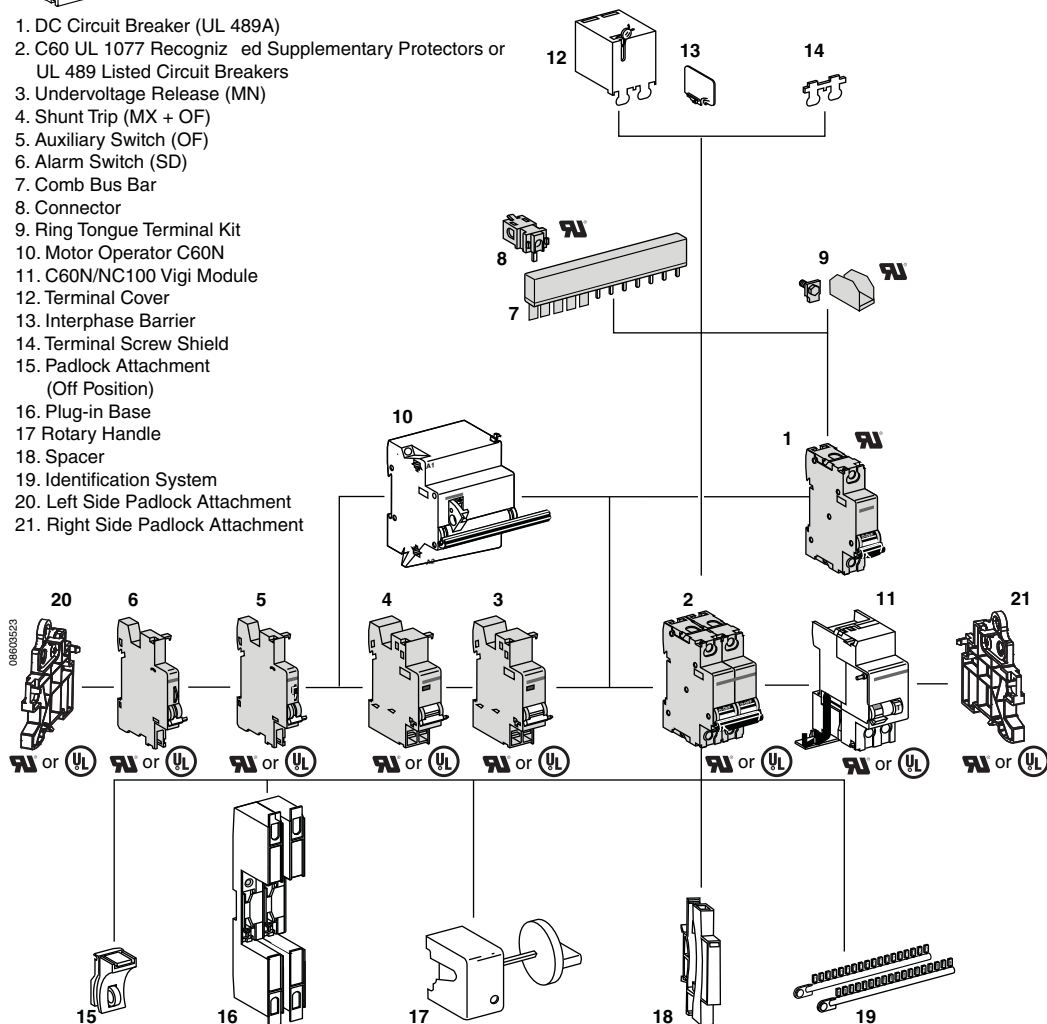
All of the accessories described in this section may be field-installed. These include electrical auxiliaries, comb bus bars, mounting devices, shielding and identification systems, operators, and display, status, and control devices.

Figure 13: Overview of Multi 9 System Accessories



Rating	Tightening Torque	Copper Cables	
		Rigid	Flexible or with End-Piece
4–40 A	3.5 N•m	1–16 mm ²	1–10 mm ²

1. DC Circuit Breaker (UL 489A)
2. C60 UL 1077 Recognized Supplementary Protectors or UL 489 Listed Circuit Breakers
3. Undervoltage Release (MN)
4. Shunt Trip (MX + OF)
5. Auxiliary Switch (OF)
6. Alarm Switch (SD)
7. Comb Bus Bar
8. Connector
9. Ring Tongue Terminal Kit
10. Motor Operator C60N
11. C60N/NC100 Vigi Module
12. Terminal Cover
13. Interphase Barrier
14. Terminal Screw Shield
15. Padlock Attachment (Off Position)
16. Plug-in Base
17. Rotary Handle
18. Spacer
19. Identification System
20. Left Side Padlock Attachment
21. Right Side Padlock Attachment



Technical Data

Main Characteristics

Earth leakage protection with instantaneous tripping 30, 300 mA

Setting temperature for ratings 4 to 40 A 30°C

Tripping curve

Curve B: the magnetic tripping devices act at between 3 and 5 I_n

Curve C: the magnetic tripping devices act at between 5 and 10 I_n

Breaking Capacity

EN61009	
Rated breaking capacity (Icn)	6,000 A
Rated residual breaking and making capacity (IΔm)	6,000 A

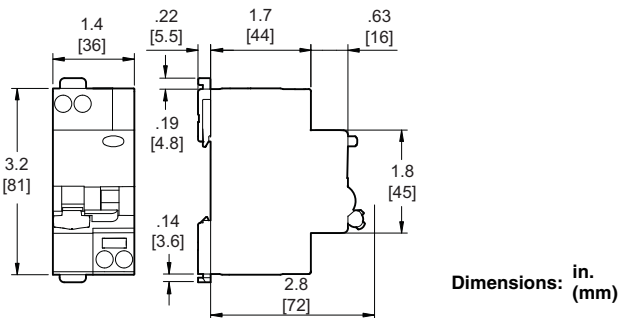
Endurance

Ratings (A)	Mechanical Endurance	Electrical Endurance Under Rated Current
	Number of O/C cycles	Number of O/C cycles
4 to 40	20,000	20,000 ≤20 A
		10,000 ≥ 25 A

Other characteristics

Degree of protection	IP4/IPxxD for the part outside of the enclosure
Insulation voltage (Ui)	400 V
Rated impulse withstand voltage (Uimp)	4 kV
Service temperature	Type AC: from -5°C to +60°C Type A and type A-si: from -25°C to +60°C
Storage temperature	-30°C to +70°C
8/20 is impulse withstand	Type AC and type A: 250 Å Type A-si : 3 kÅ
Limitation class	3
Insulation class	2
Tropicalization	Treatment 2 (relative humidity 95% at 55°C)

Dimensions



Weight

Residual Current Device	
Type	DPN N Vigì
1P+N	125 g

Electrical Auxiliaries

The Multi 9 product line includes a variety of electrical auxiliaries for the C60, C120, and NC120 supplementary protectors and circuit breakers. They may be attached to the protective device as needed to fulfill the tripping or monitoring application requirements. They include the following devices.

- MN Undervoltage Release
- MX + OF Shunt Trip and Auxiliary Switch
- OF Auxiliary Switch
- SD Alarm Switch
- TM Motor Operator
- OFS Special Auxiliary Switch (For use with GFP and ID RCCB's, allows other accessories to be mounted to the side of the GFP.)

The Multi 9 Vigi Module, which adds ground-fault protection, is described in Section 4.

Accessories have a maximum width of 54 mm and are mechanically linked to the base C60 or C120 protective devices.

Figure 14: Possible Auxiliary Combinations

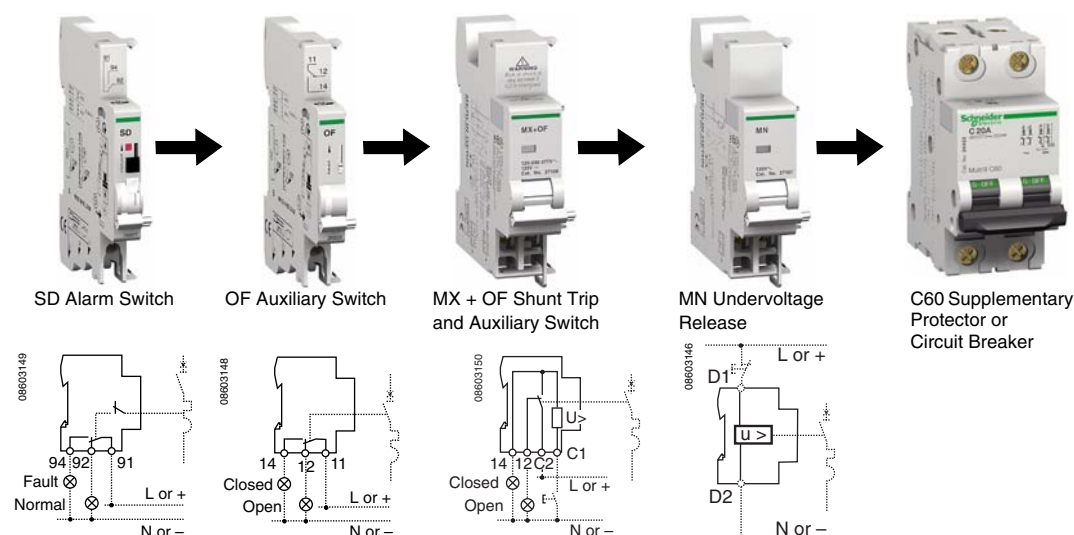


Table 40: Catalog Numbers for Electrical Auxiliary Devices

Device	Control Voltage		Modules (9mm)	C60 / C120 / GFP		
	Vac	Vdc		UL/IEC	IEC	IEC
MX + OF Shunt Trip + Aux Switch	24	24	2	27118	27118	27118
	48	48	2	27110	27110	27110
	110-240-277	125	2	27109	27109	27109
	220-277	—	—	—	—	—
MN Undervoltage Release	24	24	2	27108	27108	27108
	48	48	2	27106	27106	27106
	120	—	2	27107	27107	27107
	240	—	2	27105	27105	27105
OF Auxiliary Switch	12-277	12-125	1	MG26925	26924	26924
SD Alarm Switch	12-277	12-125	1	MG26928	26927	26927
OFS Alarm Switch for GFP Only	240/415	130	1	—	—	26923



MN Undervoltage Release

The MN Undervoltage Release provides remote tripping of C60 or C120 devices. It causes the device to trip whenever the MN detects a drop of its control voltage to the range of 70 to 35% of nominal. The tripped condition is shown by a red indicator flag on the front panel of the MN undervoltage release. The MN undervoltage release is mechanically linked to the C60 or C120 device. It may be used in conjunction with the SD Alarm Switch, OF Auxiliary Switch, and/or the MX + OF Shunt Trip and Auxiliary Switch.

NOTE: The tripped circuit breaker or supplementary protector must be manually reset. The MN Undervoltage Trip prevents the device from being reclosed until the control voltage has been restored.

Models must be selected depending on the level of control voltage source (ac or dc).

- Used for emergency stop via push button.
- Used as safety feature on circuit supplying several machines, to prevent uncontrolled restarting of motors.
- UL Recognized for use with UL 1077 Recognized devices and UL Listed for use with UL 489/CSA C22.2 No.5 Listed devices.
- CSA and IEC Rated

The linkage is mechanical, thus ensuring the integrity of the protection function. Multiple auxiliaries may be used in combination with a single C60 or C120 protective device. Terminal pads for connection of control wiring are provided for either one or two 16–14 AWG (1.5–2.5 mm²) cables.

MN Time-delayed Undervoltage Release

The time-delayed undervoltage release is identical to the standard MN undervoltage release, except that it allows brief interruptions of control power without opening the circuit breaker due to undervoltage. It allows a 0.5 second time delay before opening the associated protective device.

Table 41: Power Consumption of MX and MN Accessories

Type	Voltage	VA or W	Type	Voltage	VA or W
MX (inrush)	415 Vac	120	MN (holding)	220–240 Vac	4.1
	220–240 Vac	50		48 Vac	4.3
	48–130 Vac	200		48 Vdc	2.0
	110–130 Vdc	10	MN  (holding) ¹	220–240 Vac	4.1
	48 Vac/Vdc	22			
	24 Vac/Vdc	120			

¹ IEC Rated; not UL/CSA Recognized

Table 42: Wiring for MX and MN Accessories

Wire	Torque
16–14 AWG (0.5–2.5 mm ²) solid or stranded wire	9 lb-in (1 N•m)

MX + OF Shunt Trip and Auxiliary Switch

The MX + OF switch combines the functions of shunt trip and auxiliary switch into one device. The MX Shunt Trip, when energized by a control voltage, provides remote tripping of the associated C60 circuit breaker or supplementary protector to which it is mechanically linked.

The tripped condition is indicated by a red indicator flag on the front panel of the MX + OF. The protective device must be manually reset after being tripped by the MX.

NOTE: When the OF function is combined with the MX Shunt Trip, no test button is provided.

The MX + OF Switch may be used in conjunction with the SD Alarm Switch, which presents the trip status, and/or the MN Undervoltage Release.

- UL Recognized for use with UL 1077 Recognized devices and UL Listed for use with UL 489/CSA C22.2 No.5 Listed devices.
- CSA and IEC Rated.



OF Auxiliary Switch

The OF Auxiliary Switch communicates the OPEN or CLOSED status of the associated C60 circuit breaker or supplementary protector via auxiliary contacts. It is mechanically linked to the supplementary protector (See the SD Alarm Switch for TRIP status).

It may be used in conjunction with the SD Alarm Switch, which presents the trip status, and the MN Undervoltage Release. It would not normally be used with the MX + OF Shunt Trip because that device already includes the OF function.

- UL Recognized for use with UL 1077 Recognized devices and UL 489/CSA C22.2 No.5 Listed devices.
- CSA and IEC Rated.

OFS Auxiliary Switch and Adapter (for GFP and ID RCD)

The OFS Auxiliary Switch and Adapter has an auxiliary switch to provide the auxiliary switch function and an adapter which allows the UL Listed GFP ground fault protector and the IEC Rated ID Residual Current Switches (in Section 4) to use the same electrical accessories as the C60 supplementary protectors, including the OF Auxiliary Switch, SD Alarm Switch, MN Undervoltage Release, and/or MX + OF Shunt Trip. It may be used alone or with accessories.

IEC Rated; not UL/CSA Recognized

Table 43: Catalog Number for OFS Auxiliary Switch and Adapter

Description	Width in Modules	Catalog Number
OFS Auxiliary Switch and Adapter	1	26923

SD Alarm Switch

The SD Alarm Switch communicates the trip status of the associated C60 or C120 circuit breakers or supplementary protectors via auxiliary contacts. It is mechanically linked to the protective device. Locally, it also indicates a tripped-on-fault condition of the protective device with a red indicator flag on the front panel. (Use the OF Auxiliary Switch for open or closed status.)

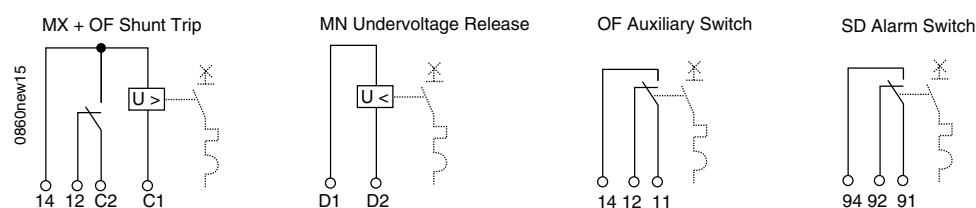
A test switch allows simulation of the SD function without operating the protective device.

The SD Alarm Switch is reset when the associated protective device is reset, or it may be reset independently of the protective device with a reset lever on its front panel.

The SD Alarm Switch may show the circuit breaker status, using V Type Signal Lamps, other annunciators, or a control system. It may be used in conjunction with the OF Auxiliary Switch which presents the open or closed status, the MN Undervoltage Release, and/or the MX + OF Shunt Trip.

- UL Recognized for use with UL 1077 Recognized devices and UL Listed for use with UL 489/CSA C22.2 No.5 Listed devices.
- CSA and IEC Rated

Figure 15: Electrical Auxiliary Schematics



Voltage	Breaking Capacity (A)	
	SD	OF
277 Vac	3	3
< 240 Vac	6	6
130 Vac	1	1
< 48 Vdc	2	2
< 24 Vdc	6	6

TM Motor Operator

The TM Motor Operator modules allow remote operation of C60 circuit breakers and supplementary protectors. The TM is mechanically linked to the protective device via its handle. This handle can also be used to manually operate the TM and its associated protective device.

The presence of a control voltage in the TM causes the closing of the circuit breaker poles; when this voltage is interrupted, the poles open. A red indicator is displayed when the TM Motor Operator is energized or being opened; the indicator is gray when it is not energized or is completely opened.

A selector switch on the TM front panel is used to disconnect the motor operator or place it in the AUTO (operational) mode. The open position frees an integral padlocking device to allow physical lockout. (Required 0.28 in. [7 mm] dia. padlock, not included.)

NOTE: Reclosing after a fault should primarily be carried out locally and in manual mode after verification and clearance of the fault. The use of an SD Alarm Switch, wired in series with the control line of the TM Motor Operator, prevents automatic and remote reclosing.

NOTE: The C60 protective device may be manually operated via its handle, even with the TM installed. The TM Motor Operator may also be used in conjunction with the OF Auxiliary Switch to give the OPEN or CLOSED status of the protective device.

IEC Rated; not UL/CSA Recognized

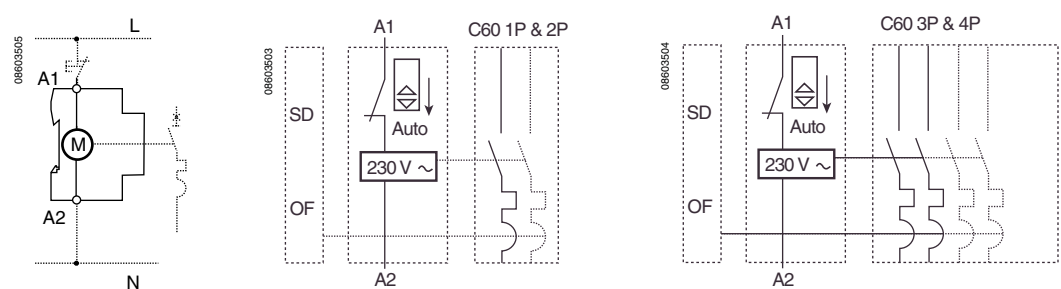
Table 44: Catalog Numbers for IEC Rated C60 TM Motor Operators

Description	IEC No
TM Remote Motor Control for C60 1P or 2P	18310
TM Remote Motor Control for C60 3P or 4P	18311
TM for C120 2P	18312

Table 45: Specifications for IEC Rated C60 TM Motor Operators

Voltage	230 Vac	-15%, +10%
Frequency	50/60 Hz	
Response to Undervoltage	Mechanical Opening of Poles Reclosing Insensitive to Short-Supply Interruptions	> 0.45 sec Two Seconds After Power is restored < 0.45 sec.
Opening Time of Associated Circuit Breaker	0.5 Sec. 0.05 Sec	By TM Motor Operator By Shunt Trip or Undervoltage Release
Rate of Operation	15 Seconds Max.	
Width	7 Modules	2.5 in. (63 mm)
Closing Time	Two Seconds	
Power Consumption	Inrush Holding	28 VA 2 VA
Status Indication	Mechanical Indicator Flag	
Number of Operating Cycles (O-C)	20,000 for TM Motor Operator/C60 Circuit Breaker Combination	At 104°F (40°C)
Terminals	Tunnel Terminals, Suitable for 10 AWG (6 mm ²) Cables	Torque to 9 lb-in (1 N•m)

Figure 16: IEC Rated TM Motor Operator Schematics



Comb Bus Bars

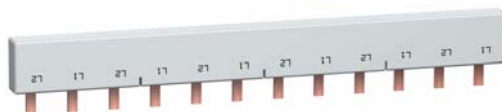
UL Recognized C60 Comb Bus Bars

A Comb Bus Bar can be used to provide common service to a number of Multi 9 supplementary protectors and accessories. This eliminates the hassle of providing discrete wiring to a number of protective devices operating from one power source. It is available in 0.71 in. (18 mm) pole spacings for the C60 series. It meets the UL 1077 requirements.

These are available in 1-, 2-, or 3-phase (conductor) models, and can be purchased in 12-pole (12P) lengths.

Field wiring may be applied directly to the comb bus bar by inserting both the conductor and the tooth of the comb into the same box lug connector of the C60N supplementary protector

Figure 17: UL Recognized C60 3-phase Comb Bus Bar



Refer also to the tooth cap accessories for the comb bus bar.

- Rated insulation voltage: 480Y/277 Vac
- Rated current: 63 A service single-feed
- Available in 1-, 2-, or 3-phases (conductors)
- Spacing of outgoing poles: 0.71 in. (18 mm)
- Lengths: Fixed length of 12 poles
- Height: 0.80 inches (20 mm) above circuit breaker
- Connection: Comb tooth and main feed wire (10 AWG to 3 AWG) connect to box lug of UL 1077 C60N supplementary protector
- UL Recognized for use with UL 1077 devices only; not CSA Recognized

Table 46: Catalog Numbers for UL Recognized C60 Comb Bus Bars

Description	Length	Type	Cat. No.
12P Comb Bus Bar	8.5 in. (216 mm)	1Ø	MG10285
		2Ø	MG10286
		3Ø	MG10287

Tooth Caps for UL Recognized Comb Bus Bars

Tooth Caps for UL Recognized Comb Bus Bars may be slipped onto the unused teeth of the Comb Bus Bar. They come in strips of five with 1-pole spacing, but can be snapped apart to be used individually.



Table 1: Tooth Caps for UL Recognized Comb Bus Bars

Description	Cat. No.
Tooth Caps for 0.71 in. (18 mm) Comb Bus Bar (20 Pieces)	60488

IEC Rated C60 Comb Bus Bars

These are available in 1-, 2-, 3- or 4-phase (conductor) models, and can be purchased in 12-pole, 24-pole, or 54-pole (1 meter) lengths.

Multi 9™ System Catalog

Section 5—Accessories

Refer also to the accessories for the Comb Bus Bar described below.

- Rated insulation voltage: 500 Vac as per IEC 664.
- Rated Current: 100 A service single-feed, 120 A double-feed
- Available in 1-, 2-, 3-, or 4-phase (conductor) models
- Spacing of outgoing poles: 18 mm (0.71 in.) on center
- Lengths: 12, 24, or 54 poles; may be cut to desired length
- IEC Rated

Figure 18: IEC Rated C60 Comb Bus Bars and End Caps

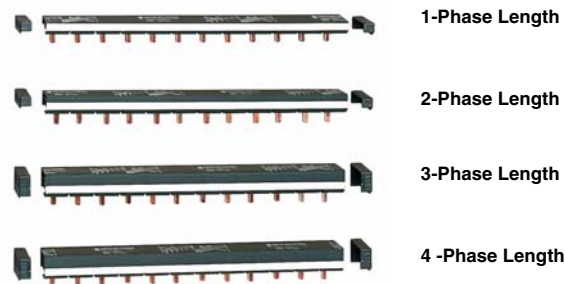


Table 47: Catalog Numbers for IEC Rated C60 Comb Bus Bars

Description	Length	Type	Cat. No.
12P Comb Bus Bar	8.5 in. (216 mm)	1Ø	MG14881
		2Ø	MG14882
		3Ø	MG14883
		4Ø	MG14884
24P Comb Bus Bar (package of 2)	17 in. (432 mm)	1Ø	MG14891
		2Ø	MG14892
		3Ø	MG14893
		4Ø	MG14894
54P Comb Bus Bar	39.4 in. (1 m)	1Ø	14801
		2Ø	14802
		3Ø	14803
		4Ø	14804

End Caps for IEC Rated C60 Comb Bus Bars

The End Caps are IEC Rated insulating devices which snap onto the ends of the Comb Bus Bar to retain the bus bars within their protective shield and to ensure the spacing of the conductors.

Table 48: End Caps for IEC Rated C60 Comb Bus Bars

Description	Type	Cat. No.
End Caps for Comb Bus Bar (40 pieces)	1Ø/2-Ø	MG14886
	3Ø/4Ø	MG14887



Connector for IEC Rated Comb Bus Bars



The IEC Rated connectors are provided for connecting field wiring to a comb bus bar. These connectors accept up to 2 AWG wiring.

- Torque: 22 lb-in (2.5 N•m)

Table 49: IEC Rated C60 Connectors

Description	Wire Size	Cat. No.
Connector (4 Pieces)	2 AWG (25 mm ²)	MG14885

Tooth Caps for IEC Rated Comb Bus Bars



Tooth Caps for IEC Rated Comb Bus Bars are insulated protectors which may be slipped onto the unused teeth of the Comb Bus Bar. Tooth caps come in strips of five with 1-pole spacing, but can be snapped apart to be used individually.

Table 50: Tooth Caps for IEC Rated Comb Bus Bars

Description	Cat. No.
Tooth Caps for Comb Bus Bar (40 pieces)	14888

Device Shielding

DIN Rail Spacer



The Spacer clips onto a DIN rail to occupy the space of one 0.35 in. (9 mm) module. It can be used to provide space for future protective devices and accessories. It may also be used to provide a ventilation gap to prevent overheating.

IEC Rated; not UL/CSA Recognized

Table 51: Catalog Numbers for IEC Rated DIN Rail Spacer

Description	Width	US No.	IEC No.
Spacer for IEC Rated C60 and C120 Circuit Breakers	0.354 in. (9 mm)	MG27062	27062

Interphase Barriers



The Interphase Barriers snap onto the top and bottom of the C60 devices to provide increased isolation distance between two adjacent connectors.

NOTE: These are not needed with the versions of C60 with UL 489/CSA C22.2 No.5 Rating nor with the Ring Lug Terminal kit, since those products already include increased isolation barriers.

IEC Rated; not UL/CSA Recognized

Table 52: Catalog Numbers IEC Rated Interphase Barrier

Description	Quantity	US No.	IEC No.
Interphase Barriers for C60 Circuit Breakers	10 Pieces	MG27001	27001

Terminal Screw Shields



The Terminal Screw Shield snaps onto the front of the C60N or C120 protective devices to provide greater insulation of the terminal screws.

IEC Rated; not UL/CSA Recognized

Table 53: IEC Rated Terminal Screw Shields for C60 Circuit Breakers¹

Description	Quantity	Cat. No.
Terminal Screw Shield	Bag of 2 Strips of 4	MG26981

¹ Not for the UL 489/CSA C22.2 No.5 Listed C60 Circuit Breakers

Terminal Covers



The Terminal Covers completely cover the terminals, either standard or screw-type connectors. They make the use of the interphase barriers unnecessary.

- IEC Rated; not UL 1077/CSA C22.2 No. 235 Recognized

Table 54: Catalog Numbers for Terminal Covers for C60 Circuit Breakers¹

Description	Device	Size	UL Recognized Cat. No.	IEC Rated Cat. No.
Terminal Cover	C60	1P	MG26975	26975
		2P	MG26976	26976
		3P	MG26975 + MG26976	26975 + 26976
		4P	MG26978	26978

¹ Not for the UL 489/CSA C22.2 No.5 Listed C60 Circuit Breaker

Ring Lug Terminal Kit



The Ring Lug Terminal kit provides isolation barriers and ring terminals to convert a standard box lug UL 1077 Recognized C60 supplementary protector or UL 489A DC rated Communications circuit breaker to allow front or rear connection with ring type terminals. The kit allows a UL 1077 Recognized C60 device or UL 489A DC rated Communications to retain its rating. It cannot be field-installed on a UL 489/CSA C22.2 No.5 Listed C60 product. UL 489/CSA C22.2 No.5 circuit breakers may be ordered with factory installed ring terminals.

These are user-installed. The Interphase Barriers (or Terminal Covers) cannot be used in conjunction with the ring tongue terminal kits.

- Torque for ring tongue into box lug: 30 lb-in (3.4 N•m)
- Torque for ring terminal: 18 lb-in (2.0 N•m)

Table 55: UL Recognized Ring Lug Terminal Kit

Description	Quantity	Cat. No.
Ring Lug Terminal Kit	Two Ring Tongue Terminals	17400
	Two Isolation Shrouds	
	Two 5 mm Screws	

Identification System

Snap-on Marking Symbols



The Identification System provides marking symbols which can be used on the C60 and C120 devices. They provide pre-labeled, snap-on plastic clips with one character each. They mount just below the toggle on the C60 devices.

The following symbols are available: Blank, 0-9, +, -, and A-Z.

Orders must specify standard package quantity of 25 strips of each character or multiples of 25.

NOTE: These are same as markers for Telemecanique AB1 terminal blocks.

IEC Rated; not UL/CSA Recognized

Table 56: Catalog Numbers for Snap-on Marking Symbols

Marking	Quantity	Cat. No.	Marking	Quantity	Cat. No.
A	Strip of 10	AB1GA	1	Strip of 10	AB1R1
B	Strip of 10	AB1GB	2	Strip of 10	AB1R2
C	Strip of 10	AB1GC	3	Strip of 10	AB1R3
D	Strip of 10	AB1GD	4	Strip of 10	AB1R4
E	Strip of 10	AB1GE	5	Strip of 10	AB1R5
F	Strip of 10	AB1GF	6	Strip of 10	AB1R6
G	Strip of 10	AB1GG	7	Strip of 10	AB1R7
H	Strip of 10	AB1GH	8	Strip of 10	AB1R8
I	Strip of 10	AB1GI	9	Strip of 10	AB1R9
J	Strip of 10	AB1GJ	0	Strip of 10	AB1R0
K	Strip of 10	AB1GK			
L	Strip of 10	AB1GL			
M	Strip of 10	AB1GM	0-9	Strip of 10	AB1R11
N	Strip of 10	AB1GN			
O	Strip of 10	AB1GO			
P	Strip of 10	AB1GP			
Q	Strip of 10	AB1GQ	+	Strip of 10	AB1R12
R	Strip of 10	AB1GR	-	Strip of 10	AB1R13
S	Strip of 10	AB1GS			
T	Strip of 10	AB1GT			
U	Strip of 10	AB1GU	Blank	Strip of 10	AB1RV
V	Strip of 10	AB1GV			
W	Strip of 10	AB1GW			
X	Strip of 10	AB1GX			
Y	Strip of 10	AB1GY			
Z	Strip of 10	AB1GZ			

Label Holder

Used to identify a 2-, 3-, or 4-pole C60 or C120 device. Holds label provided by user.

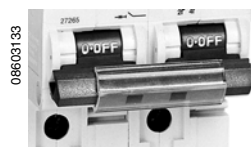


Table 57: Label Holders

Description	Cat. No.
Label Holder (Bag of 10)	MG27150

Operation Devices

Rotary Handles

A C60 or C120 protection device with 2-, 3-, or 4-poles can be equipped with a rotary handle with an extension to allow operation of the circuit breaker from either the front or the side (lateral) from the outside of a panel.

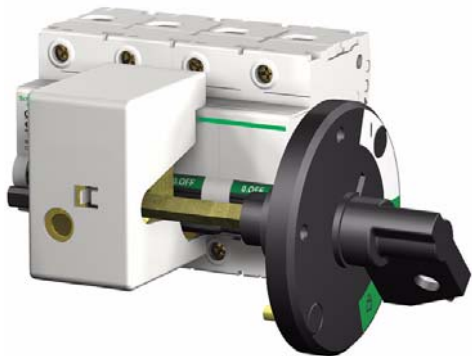
The handle requires that an operating subassembly be affixed to the supplementary protector or circuit breaker. The operating subassembly requires one of two versions of the rotary handle:

- The first is a fixed handle for front or lateral mounting on a fixed panel.
 - The second is a draw-out extended handle which may be mounted on a door or hinged panel. It mates with the operating subassembly as the door is closed.
- Minimum depth for drawout is 6.8 in. (174 mm) including circuit breaker.
 - Minimum depth for lateral installation is 4.8 in. (122 mm) including circuit breaker.
 - IEC Rated; not UL/CSA Recognized

Table 58: IEC Rated Rotary Handles

Description	US Cat. No.	IEC Cat. No.
Operating Subassembly for C60 or C120 Protection Device (Fixed to Protection Device)	MG27046	27046
Drawout Extended Handle (Mounted on Door or Hinged Panel)	MG27047	27047
Fixed Handle Front or Lateral (Mounted on Fixed Panel)	MG27048	27048

Operating Subassembly with Lateral Rotary Handle



Padlock Attachments

The Padlock Attachment clips onto the face of the C60N device to prevent the handle from being operated. It cannot be installed or removed when padlocked. No tools are needed to install it.

The Padlock Attachment allows the IEC C60 circuit breaker to be locked in either the ON or the OFF position (UL 489/CSA C22.2 No.5 Listed and UL 1077 Recognized devices can lock in the OFF position only). The padlock attachment accepts a 0.315 in. (8 mm) diameter padlock, which is not supplied.

The front plate or functional door can be opened with the circuit breaker locked in the OFF position.

NOTE: Locking the C60 or C120 in the ON position will not prevent the device from tripping under overcurrent or ground fault conditions.

IEC Rated; not UL/CSA Recognized

Table 59: Catalog Numbers for IEC Rated Padlock Attachments

Description	Quantity	US Cat. No.	IEC Cat. No.
Padlock Attachment for C60 Protection Device	Bag of 2	MG26970	26970
Heavy-Duty Padlock Attachment for C60N	Bag of 2	M9PAF	—
Padlock Attachment for C120 Protection Device	Bag of 4	MG27145	27145

Padlock Attachment



Heavy-Duty Padlock Attachment



Lock-Off Attachments

Handle Lockoff Attachment



The Lock-Off Attachment is a permanently-installed, side-mounted accessory for the C60 and C120 circuit breakers to allow locking the circuit breaker in the off position. The attachment is available for right or left side application and is made of optically clear materials so text on the side of the circuit breaker can still be read after installation. The lock-off attachment accepts a 0.25–0.375 in. (6–9.5 mm) diameter padlock, which is not supplied.

The front plate or functional door can be opened with the circuit breaker locked in the OFF position.

UL Rated; CSA Recognized

Table 60: Catalog Numbers for Handle Lock-Off Attachments

Description	Left Hand Kit	Right Hand Kit
Handle Lock-Off Kit for C60 Protection Device	MGN26380	MGN26381
Handle Lock-Off Kit for C120 Protection Device	MGN26382	MGN26383

Mounting Accessories

Plug-in Base

The Plug-in Base allows permanent field wiring connections to be made to the base, so that a C60 device can be plugged in or removed without affecting field wiring.

The Plug-in Base kit includes spade connectors which must be installed on the circuit breaker so it will mate with the Plug-in Base. The Plug-in Base provides no-load isolation of a circuit protected by C60 supplementary protectors.

While the circuit breaker is removed, the base can be locked using a 0.32 in. (8 mm) dia. padlock (not provided).

- Height of base: 7.0 in. (178 mm); with terminal cover extended, 9.3 in. (237 mm)
- Allow minimum center spacing of 7.87 in. (200 mm) between two rows of bases
- Multiple bases may be used for multi-pole devices
- IEC Rated; not UL/CSA Recognized

Table 61: Catalog Numbers for IEC Rated Plug-in Base

Description	US Cat. No.	IEC Cat. No.
Plug-In Base for C60 Devices	MG26996	26996

Front Mounting Bracket (Kit)

The Front Mounting Bracket provides a convenient way to mount Multi 9 circuit breakers, supplementary protectors or accessories. Its height is equal to a 35 mm DIN rail, and allows the C60 and C120 devices to be clipped onto it in a standard manner. Its width is available for 1-, 2-, 3-, or 4-pole devices.

In 480 Vac UL 1077 applications, Cat. No. 26981 (C60) or 27152 (C120) Terminal Screw Shield should be used for increased isolation between the terminal screws of the Multi 9 device and the mounting bracket. These shields are included with the mounting bracket kits.

UL/CSA Recognized and IEC Rated

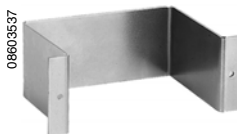


Table 62: Catalog Numbers for Front Mounting Bracket Ordering Information

Description	Size	Cat. No.
Front Mounting Bracket for C60 Protective Devices	1P	MG26983
	2P	MG26984
	3P	MG26985
	4P	MG26989
Front Mounting Bracket for C120 Protective Devices	1P	MG26986
	2P	MG26987
	3P	MG26988
	4P	MG26990

NOTE: See dimensional drawings in Section 7.

DIN Rail Mounting Clips

Additional DIN Rail Mounting Clips for Multi 9 products are available.

Table 63: DIN Rail Mounting Clips

Description	Cat. No.
DIN Rail Mounting Clip (Bag of 50)	MG27124



UL/CSA Recognized Mounting Base for Multi 9 C60 Circuit Breakers

The mounting base for UL 489/CSA C22.2 No.5 240 V Multi 9 C60 miniature circuit breakers is designed for OEM applications requiring a large number of Multi 9 circuit breakers in a single piece of equipment. Providing a means for mounting and a bus for line power, this mounting base offers a convenient solution to powering an entire group of circuit breakers. In addition to simplifying wiring for multiple UL 489 240 V devices, the mounting base minimizes the cost of installation by eliminating discrete wiring of line conductors.

The mounting bases for UL 489/CSA C22.2 No.5 240 V Multi 9 C60 circuit breakers are offered in a variety of configurations, which meet most OEM applications. Available in lengths from 12 to 60 poles, this mounting base handles the large number of Multi 9 circuit breakers found in OEM equipment.

The standard terminals on the US mounted base are 1-inch wide and have 1/4-20 x 1-in. studs, which can be used with compression (ring) terminals or with a bus bar. Nuts with washers are provided for each terminal stud. The terminals of the UL mounting base are aligned with the load terminals of the PowerPact H- and J-frame molded case circuit breakers. This allows them to be connected using straight, flat jumper bars.

UL/CSA Recognized for use with U489 240 V Multi 9 C60 miniature circuit breakers per UL 67, CSA C22.2 No. 29 and IEC 60439-1. Also CE marked.

Table 64: Specifications for Mounting Base for UL 489/CSA C22.2 No.5 Multi 9 C60 Circuit Breakers

Voltage	240 Vac 125 Vdc
Ampacity	200 A Maximum, see table below
Withstand Rating	10 ka @ 0.05 seconds
Conductors/Bus	1, 2 and 3 Conductors, Suitable for Use with 1P, 2P and 3P Circuit Breakers
Pole Capacity	12, 24, 36, 48, 60
Branch Circuit Breakers	UL 489/CSA C22.2 No.5 240 V C60 with 18 mm Spacing
Input Terminal	1 in. Wide Terminal with 1/4-20 x 1 in. Studs with Nuts/Washers for Compression Ring Lugs, Bus Bar or Optional Lugs

Table 65: Catalog Numbers for Mounting Base for UL 489/CSA C22.2 No.5 Multi 9 C60 Circuit Breakers

Poles	1 Conductor		2 Conductors		3 Conductors	
	Maximum Amperage	Cat. No	Maximum Amperage	Cat. No	Maximum Amperage	Cat. No
12	200 A	US11220018	150 A	US21215018	100 A	US31210018
24	200 A	US12420018	200 A	US22420018	200 A	US32420018
36	200 A	US13620018	200 A	US23620018	200 A	US33620018
48	200 A	US14820018	200 A	US24820018	200 A	US34820018
60	200 A	US16020018	200 A	US26020018	200 A	US36020018

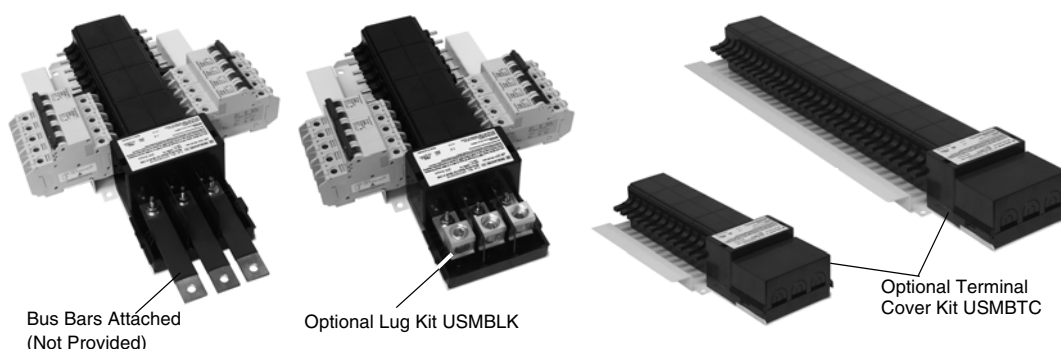
US Mounting Base Accessories

Wire Lug Kit

The optional Wire Lug Kit, Catalog Number USMBLK, can be field installed for use with cable. Each kit consists of one lug, one nut and washer assembly. One kit must be ordered for each conductor terminal. The lug mounts on the 1/4-in. terminal stud of the mount base and is secured with a nut with washer. This lug accepts 6 AWG to 300 kcmil copper or aluminum cable. The barriers between the phases provide separation between the phases; an optional terminal cover is also available.

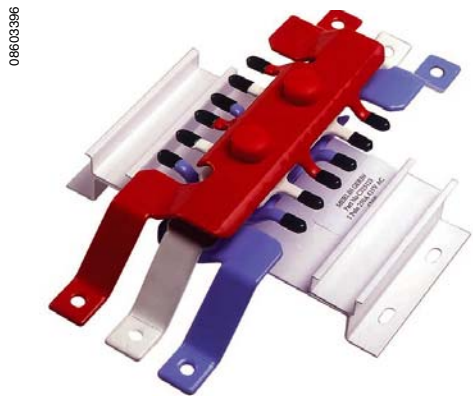
Terminal Cover Kit

The optional Terminal Cover Kit, Catalog Number USMBTC, is designed to provide shielding of the terminals, bus bars, lugs and cabling. Snapping onto the terminal end of the mounting base, the terminal cover has an opening for a bus bar jumper and knock-outs to accommodate various sizes of cable.



MSC IEC Mounting Base

The Multi 9 MSC Mounting Base is an integral package that provides DIN mounting of Multi 9 devices and provides either a 2-phase or 3-phase bus bar for up to 24 poles (in two rows) of C60 devices and accessories. The MSC 27 is used for IEC rated C120 products.



The base is rugged, gloss-white, zinc annealed sheet steel with two rows of DIN mounting rails. The heavy-duty base plate allows surface mounting. The single-piece copper bus conductors are insulated and color-coded. Power may be supplied by a reverse-fed C60 circuit breaker, or via the feed-through connections at the end of the bus. The feed lugs are compatible with Compact® NS250 molded case circuit breakers and Interpact™ INS-250 switches.

- Rating: Up to 250 A service
- Insulation voltage: 690 Vac
- Current withstand:
 - Peak: 52.5 kA
 - Short-time: 25 kA for 0.1 sec.
- Phases are color-coded
- Width: Base 8.5 in. (216 mm); see Table 66 for length
- Tested to Australian AS3439-1 and AS3439-3 standards (equivalent to IEC 439)
- IEC Rated; not UL/CSA Recognized

Table 66: Catalog Numbers for IEC Rated MSC Mounting Base for Multi 9 Devices

Type	Size	No. of Poles	Base Length ¹ (in./mm)	Cat. No. ²
MSC DC for C60 Protection Devices (Black, Red)	2Ø	12	4.33/110	C3DC123
		16	5.75/146	C3DC163
		20	7.17/182	C3DC203
MSC 18 for C60 Protection Devices (Red, White, Blue)	3Ø	12	4.33/110	C325123
		18	6.46/164	C325183
		24	8.58/218	C325243
MSC 27 for C120 Protection Devices (Red, White, Blue)	3Ø	12	9.57/162	C125123
		18	14.35/243	C125183
		24	19.13/324	C125243

¹ For overall length, add approximately 5 in. (127 mm) for bus terminals.

² Add -TF suffix for top feed only.

NOTE: Other options are available by special order, including: lengths up to 72 poles, line feed lugs at one end only, and other variations.

Multi-Pole Front Mounting Kit

The Multi-Pole Front Mounting Kit consists of a transparent, hinged, weatherproof cover. It allows installation of up to twenty modules (10 poles of C60) of Multi 9 circuit breakers or supplementary protectors and accessories. A DIN mounting rail with support is also available.

- Degree of protection as per IEC 529: IP55
- Dimensions (w x h x d): 9.25 x 4.96 x 1.3 in. (235 x 126 x 33 mm)
- Cutout dimensions: 7.32 x 3.78 in. (186 x 96 mm)
- IEC Rated; not UL/CSA Recognized

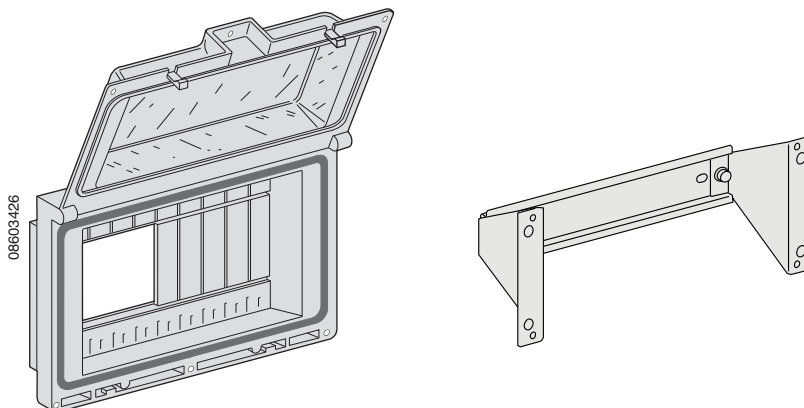


Table 67: Catalog Numbers for IEC Rated Multi-Pole Front Mounting Kit

Description	Cat. No.
Multi-Pole Front Mounting Kit with Transparent Hinged Cover (Includes a 10-Module Divisible Blanking Plate and Mounting Template)	14210
DIN Rail with Support	14211

Pole Filler

The Multi 9 M9PF4 pole filler is used to fill empty panel spaces. They clip into the space. Each M9PF4 consists of four strips of four by 18 mm pole fillers (16 poles total). They may be snapped apart in 9 mm increments.

Table 68: Pole Filler

Description	Cat. No.
Pole Filler, Four Strips of Four by 18 mm	M9PF4



One Strip of M9PF4

Section 6—Additional System Devices

In addition to the C60 and C120 Circuit Breakers and Supplementary Protectors which form the heart of the Multi 9 product line, there are a variety of other devices which may be used with C60 or C120 devices or as stand-alone devices.

These include the following:

- CM Selector Switches (Change-Over)
- I Current Isolating Switches
- V Signal Lamps and BP Push Buttons
- CI Impulse Counters and CH Hour Counters

NOTE: See Section 4 for Ground-Fault Protection Devices.

All of these devices adhere to the Multi 9 packaging format, and can be mounted on a DIN rail in the protection and control cabinet.

NOTE: See Class 1312 Catalog (document no. 1312CT0101) for recommended protection of the SPD.

CM Selector Switches

The CM Selector Switch allows manual selection of circuits. Different models are available to allow selection of two or three positions (including off) for one or two circuits. They have maximum ratings of 20 A and 250 Vac and accept cable up to 7 AWG (10 mm²). Torque cable to 11 in-lb (1.2 N•m).

This device may be installed on the DIN rail adjacent to the C60 device and its accessories or remotely in a user interface panel.

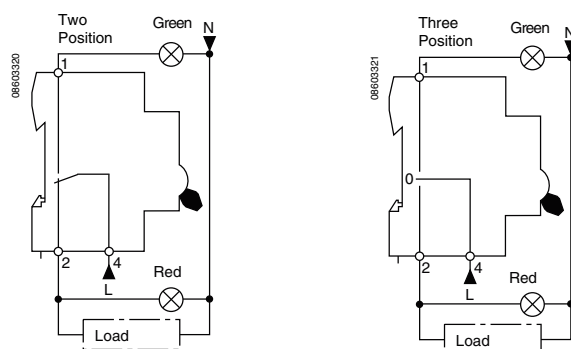
IEC Rated; not UL/CSA Recognized



Table 69: IEC Rated CM Selector Switches

CM Selector Switch Type	No. of Circuits	No. of Positions	Width in Modules	Cat. No.
	1	2	2	18070
	1	3	2	18073
	2	2	4	18071
	2	3	4	18074
	2	2	4	18072

Figure 19: IEC Rated CM Selector Switch Schematics



I Current Isolating Switch

The I Isolating Switch provides manual on-load opening or closing of a circuit. Note that it does not provide either thermal or magnetic protection.

It can be used with the OF auxiliary switch and with other non-electrical accessories in the C60 circuit breaker family. This device may be installed on the DIN rail adjacent to the C60 device and its accessories or remotely in a user interface panel.

IEC Rated; not UL/CSA Recognized

Table 70: I Current Isolating Switch Termination

Amperage	Wire Type	Wire Size		Torque	
20 and 32 A	Stranded	16–6 AWG	1.5–10 mm ²	16 lb-in	1.8 N•m
	Solid	16–6 AWG	1.5–10 mm ²	16 lb-in	1.8 N•m
40–125 A	Stranded	10–1 AWG	6–50 mm ²	40 lb-in	4.5 N•m
	Solid	14–4 AWG	2.5–35 mm ²	40 lb-in	4.5 N•m

Table 71: Catalog Numbers for IEC Rated I Current Isolating Switches

Rating (A)	1P (250 Vac) 2 Modules	2P (415 Vac) 2 Modules	2P (440 Vac) 4 Modules	3P (415 Vac) 4 Modules	3P (440 Vac) 6 Modules	4P (415 Vac) 4 Modules	4P (40 Vac) 8 Modules
20	15005	15006	—	15007	—	15008	—
32	15009	15010	—	15011	—	15012	—
40	15024	—	15020	—	15023	—	15019
63	15013	—	15014	—	15015	—	15016
100	15090	—	15091	—	15092	—	15093
125	15057	—	15058	—	15059	—	15060

Figure 20: I Switches



Status, Display and Control Accessories

There are a variety of other accessories which may be used with the C60 or C120 devices to communicate control and/or status information. These include the following:

- V Type Signal Lamps
- BP Push Buttons
- CH Hour Counter
- CI Impulse Counter

These accessories may be located adjacent to the C60 or C120 devices or may be located remotely.

V Signal Lamp

The V Type Signal Lamp indicates when voltage is applied to a circuit and may be used with Multi 9 circuit protection systems or other applications. The lamps are high-efficiency, long-life LEDs. The lenses are available in a variety of colors.

This accessory device may be installed on the DIN rail adjacent to the C60 devices and its accessories or remotely in a user interface panel. It accepts cable up to 7 AWG (10 mm²). Torque cable to 11 in-lb (1.2 N•m).

NOTE: IEC Rated; not UL/CSA Recognized

Table 72: Multi 9 IEC Rated V Indicator Lights

Type	Width in 9 mm Modules	Color	Cat No. 110-230 Vac	Cat No. 12–48 Vac/Vdc
Single LED Indicator Light				
	2	Red	18320	18330
		Green	18321	18331
		White	18322	18332
		Blue	18323	18333
		Yellow	18324	18334
Double LED Indicator Light				
	2	Green/Red	18325	18335
Blinker				
	2	Red	18326	





Push Buttons with Signal Lamps

BP Push Buttons

The BP Push Button device may be used to control Multi 9 circuit protection systems or other equipment. It provides momentary switching and is available with one N.O., one N.C., or combined with one each N.O. + N.C. contact.

It is available with or without a signal lamp, which is available in a variety of colors. The lamps are high-efficiency long-life LEDs.

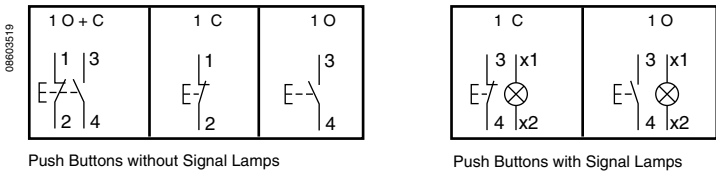
This device may be installed on the DIN rail adjacent to the C60 and its accessories or remotely in a user interface panel. It accepts cable up to 7 AWG (10 mm²). Torque cable to 11 in-lb (1.2 N•m).

NOTE: IEC Rated; not UL/CSA Recognized

Table 73: IEC Rated Multi 9 BP Pushbuttons Catalog Numbers

Type	Width in 9 mm Modules	Power	Lamp Color	Pushbutton Color	Circuit	Catalog Number
Single BP						
	2			Grey	1 NC	18030
				Red	1 NC	18031
				Grey	1 NO	18032
				Grey	1 NO + 1 NC	18033
Double BP						
	2			Green/Red	1 NO / 1 NC	18034
				Grey/Grey	1 NO / 1 NO	18035
Single BP + LED Indicator Light						
	2	110-230 Vac	Green	Grey	1 NO	18036
			Red	Grey	1 NC	18037
		12-48 Vac/Vdc	Green	Grey	1 NO	18038
			Red	Grey	1 NC	18039

Figure 21: Schematics for IEC Rated BP Push Button Types



CH Hour Counter



The CH Hour Counter is used for measuring the total operating time of a circuit or load. It is capable of counting to a maximum of 99,999.99 hours. It operates on 224–440 Vac, 50 Hz. The CH must be installed downstream of a circuit breaker or supplementary protector.

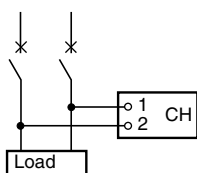
The CH Hour Counter is useful for metering of activity or for scheduling maintenance.

This device may be installed on the DIN rail adjacent to the C60 and its accessories or remotely in a user interface panel.

NOTE: IEC Rated; not UL/CSA Recognized

Table 74: Information for IEC Rated CH Hour Counter

Wire Size		Torque	
16–14 AWG	1–2.5 mm ²	0.8 lb-in	1.1 N•m



CI Impulse Counter



The CI Impulse Counter is an electromechanical counter designed to measure impulses produced by various devices. It displays the running total of metered impulses up to a maximum count of 9,999,999 impulses. The CI Impulse Counter is unaffected by interruptions in the main power supply.

It is most suitable for counting impulses emitted by detectors such as kilowatt-hour metering, temperature overrun, etc.

This device may be installed on the DIN rail adjacent to the C60 device and its accessories or remotely in a user interface panel.



Figure 22: Schematics for IEC Rated CI Impulse Counter

NOTE: IEC Rated; Not UL/CSA Recognized

Table 75: CH Hour Counter and CI Impulse Counter

Type	Voltage (Vac)	Frequency (15% to +6%)	Width in Modules	Cat. No.
CH	220–240	50 Hz	4	15440
CI	220–240	50/60 Hz	4	15443

Table 76: Wiring Information

Wire Size		Torque	
16–14 AWG	1–2.5 mm ²	0.8 lb-in	1.1 N•m

Kaedra™ Weatherproof DIN Type Enclosures

Applications

- Expandable enclosures for service, industrial, or equipment applications
- Protects against water, dust, and chemical and atmospheric agents
- Kaedra™ mini-enclosures are designed for small installations (3 to 12 modules) replacing Mini-Pragma™ weatherproof enclosures.
- Kaedra enclosures come in seven sizes from 12 to 72 modules (18 mm per module)

Standard Features

- IP 65: as per IEC 60529 for protection against ingress of solids and liquids
- IK09: Protection against shocks and resistance to chemical and atmospheric agents, ultraviolet light, etc.
- Class 2: Total insulation
- Flame and abnormal heat resistance: 750°C as per IEC 60695-2-1
- Conformity with IEC 670 standard for empty enclosures and with IEC 439-3 standard for equipped switchboards.
- It is made of insulating material, Class 2, and can be sealed and/or locked (keylock or insert). It complies with IEC 60439-3 Standards.
Not UL/CSA recognized.

Construction

- Modern, non-metallic (styrene), sturdy appearance in light gray RAL 7035; smooth surfaces and rounded corners to increase impact strength.
- Transparent (green) door for immediate visibility; door can be mounted left or right with clip-on hinges; secure closing due to multiple latching points; door may be locked to limit access.
- Punchout holes on four sides and back enable cable insertion throughout.

Installation

- Can be installed horizontally and/or vertically
- Enclosures can be combined and added at any time using the association kits to provide mechanical connection and cable routing.
- Cabling is quick and efficient with the provided terminal blocks and wiring straps.
- Distance between rails (125, 150, 175 mm) and rail depth are adjustable. Chassis can be removed for assembly of equipment
- Function identification with a clip-on label with protection cover.



KAEDRA™ Weatherproof Mini-Enclosure

Table 77: Kaedra™ Weatherproof Mini-Enclosures¹

Description	Dimensions						Cat. No.
	W		H		D		
	in.	mm	in.	mm	in.	mm	
1 Row of 3 Modules ²	3.15	80	5.9	150	3.86	98	13956
1 Row of 4 Modules	4.84	123	7.87	200	4.41	112	13957
1 Row of 6 Modules	6.26	159	7.87	200	4.41	112	13958
1 Row of 8 Modules	7.68	159	7.87	200	4.41	112	13959
1 Row of 12 Modules	10.51	267	7.87	200	4.41	112	13960

¹ Accessories include: Terminal blocks and terminal block support; Class II plugs

² Enclosure modules are 18 mm wide.

NOTE: The Kaedra™ Weatherproof enclosures replace the Mini-Pragma™ enclosures.

Table 78: Kaedra™ Weatherproof Enclosures¹

Description	Dimensions						Cat. No.
	W		H		D		
	in.	mm	in.	mm	in.	mm	
1 Row of 12 Modules ²	13.39	340	11.02	280	6.23	160	13962
2 Rows of 12 Modules	13.39	340	18.11	460	6.23	160	13964
3 Rows of 12 Modules	13.39	340	24.02	610	6.23	160	13966
1 Row of 18 Modules	13.39	340	11.02	280	6.23	160	13963
2 Rows of 18 Modules	13.39	340	18.11	460	6.23	160	13965
3 Rows of 18 Modules	13.39	340	24.02	610	6.23	160	13967
4 Rows of 18 Modules	13.39	340	33.15	842	6.23	160	13968

¹ Accessories include: Terminal blocks and terminal block support; 1 marking kit per row; 1 wiring strap per row; Class II plugs, and blanking plates (5 x 18 mm modules per row)

² Enclosure modules are 18 mm wide.



KAEDRA™ Weatherproof Enclosure

Accessories

Necessary accessories are included with enclosure, including: Terminal blocks and terminal block support; one marking kit; Class II plugs

Other options available are listed in Table 79.

Table 79: Kaedra™ Weatherproof Enclosure Accessories

Description	Cat. No.
Association Kit (2 Sleeves + 4 Nuts + 4 Washers)	13934
Blanking Plate (Set of 10 x 5 Modules)	13940
Sealing Kit (2 Screws, 5 Fasteners)	13947
Keylock (Eurolock no. 850)	13948
Plain Front Plate, 12 Modules	13944
Plain Front Plate, 18 Modules	13945
Cable Gland, PG11 (0.732 in./18.6 mm)	83992
Cable Gland, PG13.5	83993
Cable Gland, PG16 (0.886 in./22.5 mm)	83994
Cable Gland, PG21 (1.114 in./28.3 mm)	83995
Cable Gland, PG29 (1.457 in./37 mm)	83996
Cable Gland, PG36 (1.85 in./47 mm)	83997

Section 7—Dimensions

UL 489/CSA C22.2 No. 5 Listed C60 Circuit Breakers

Figure 23: UL 489/CSA C22.2 No.5 Listed C60 240 Vac Circuit Breaker with Box Lug Terminals

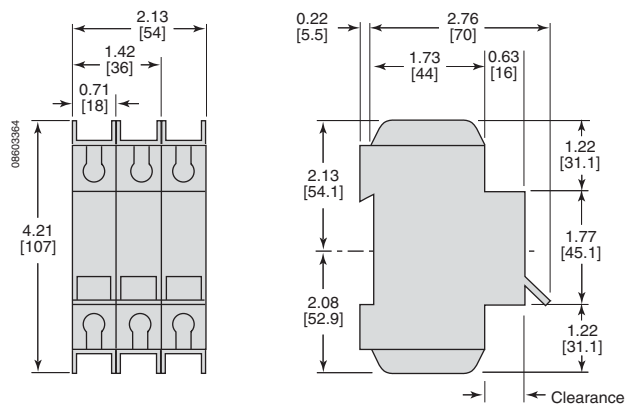


Figure 24: UL 489/CSA C22.2 No.5 Listed C60 240 Vac Circuit Breaker with Ring Tongue Terminals

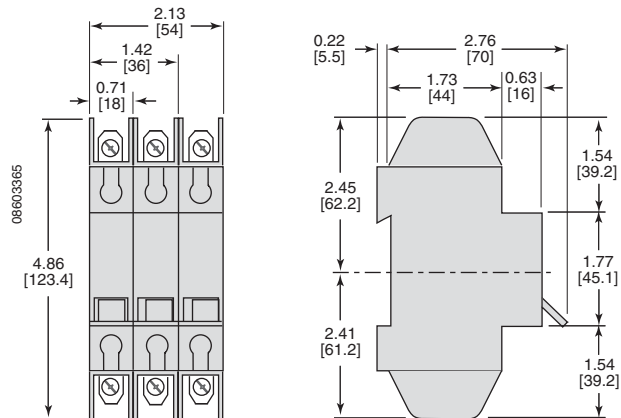


Figure 25: UL 489/CSA C22.2 No.5 C60 480 Vac and 240 Vac Circuit Breaker with Fingersafe Shields

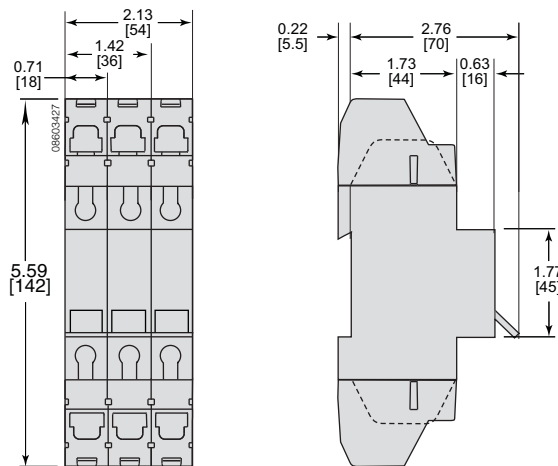
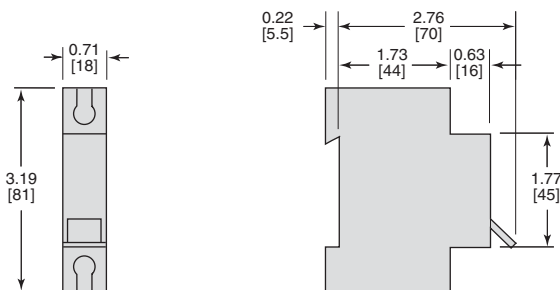
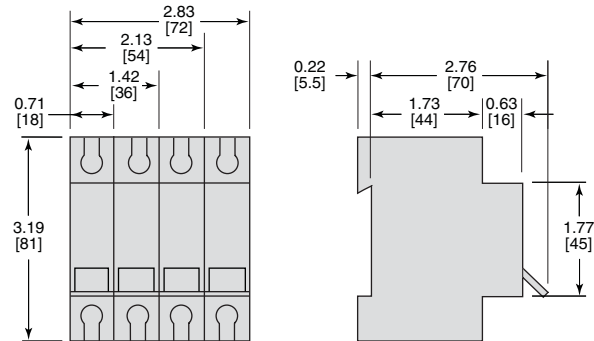


Figure 26: UL 489A Listed C60 60 Vdc Circuit Breakers for DC Telecommunications Applications



UL 1077 Supplementary Protectors

Figure 27: C60 UL 1077 Supplementary Protectors



IEC Rated Circuit Breakers

Figure 28: IEC DPN-N Circuit Breaker

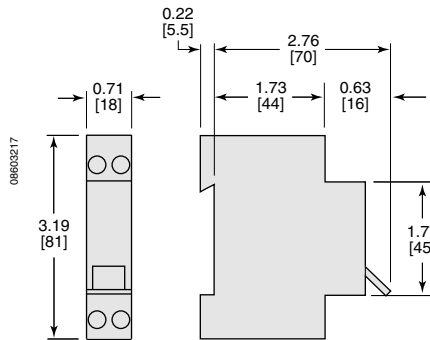


Figure 29: C60 IEC Circuit Breakers

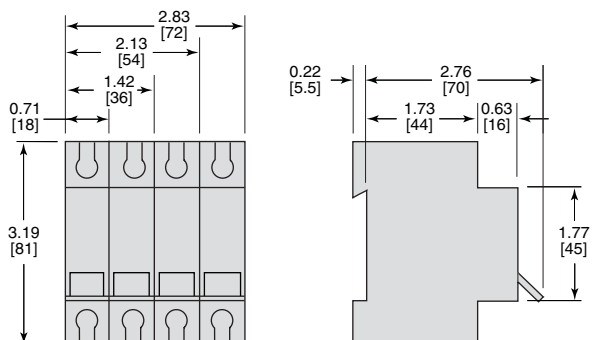
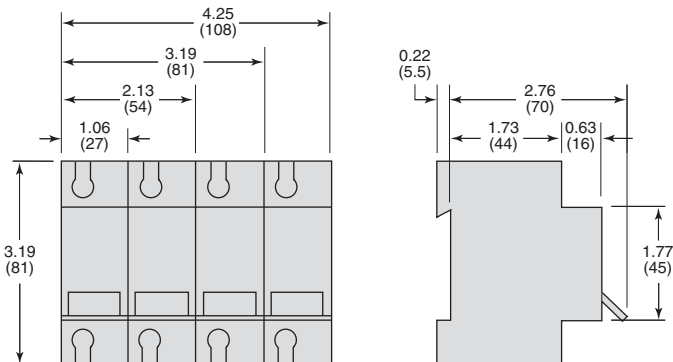


Figure 30: C120 IEC Circuit Breaker



Dimensions: in.
(mm)

UL and IEC Rated Ground-Fault Products

Figure 31: UL GFP Ground-Fault Protector and IEC ID Residual Current Switch

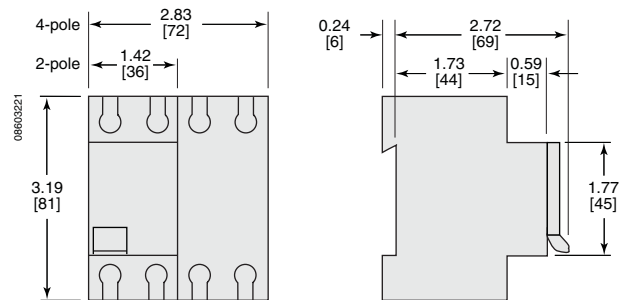


Figure 32: IEC Vigı Ground-Fault Module for C60 Devices

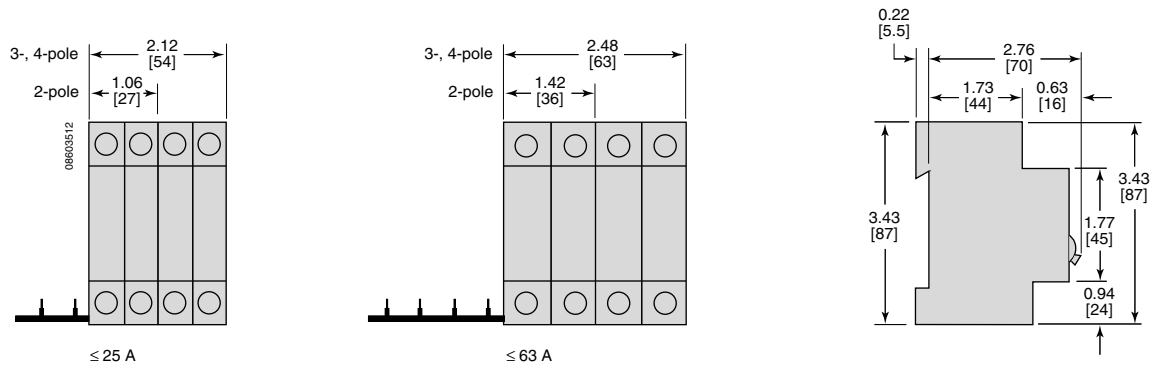
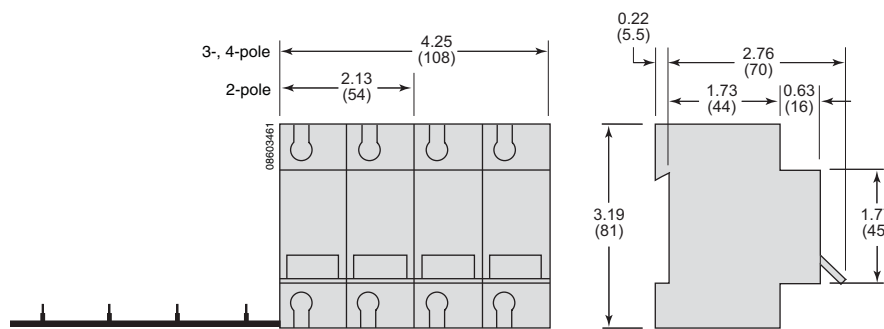


Figure 33: IEC Vigı Ground-Fault Module for C120 Devices



Dimensions: in.
(mm)

Accessory Dimensions

Figure 34: OF Auxiliary Switch, SD Alarm Switch, MN Undervoltage Release and MX + OF Shunt Trip with Auxiliary Switch for C60 and C120

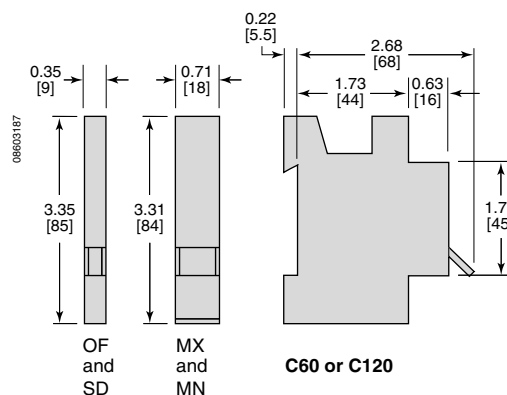


Figure 35: OFS Auxiliary Switch and Adapter for GFP Ground-Fault Protector and ID Residual Current Switch

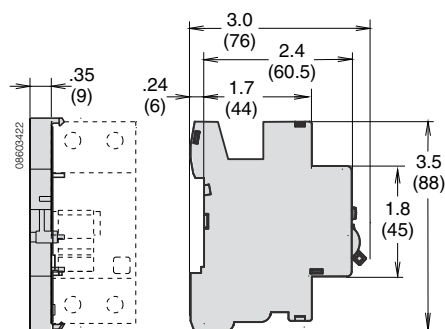


Figure 36: TM Motor Operator for C60 Devices

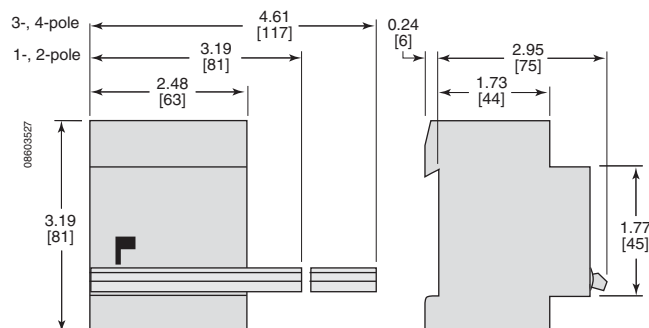


Figure 37: Spacer for C60 and C120 Devices

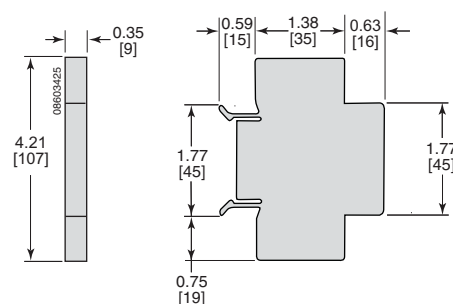


Figure 38: Interphase Barriers for C60 Devices

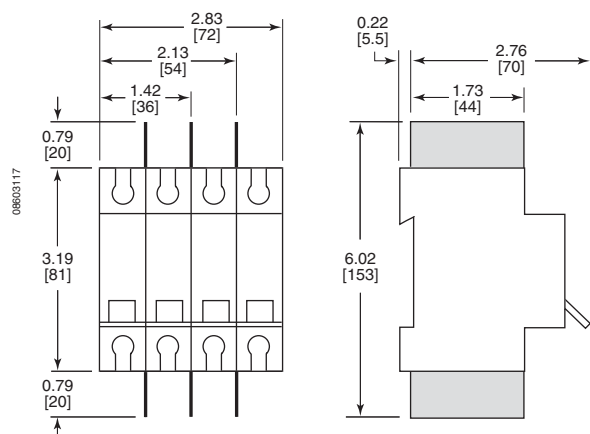
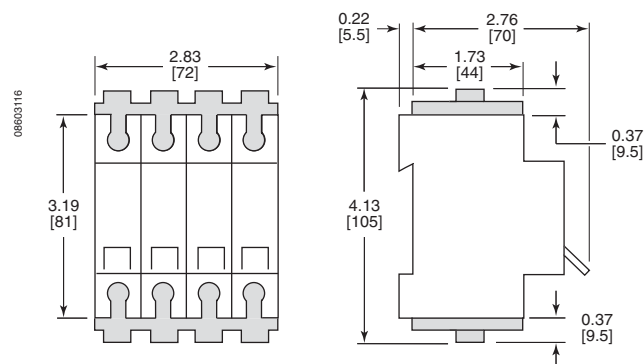


Figure 39: Terminal Screw Shield for UL 489A, UL 1077 and IEC C60 Devices



Dimensions: in.
(mm)

Multi 9™ System Catalog

Section 7—Dimensions

Figure 40: Plug-In Base for UL 489A, UL 1077 and IEC C60 Devices

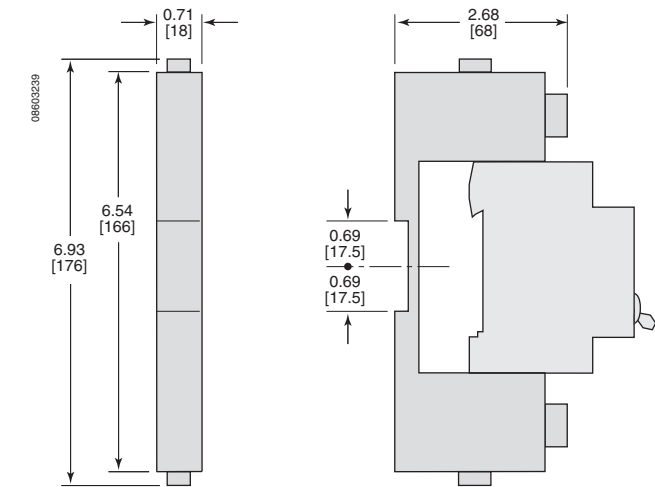


Figure 41: Terminal Cover for UL 489A, UL 1077 and IEC C60 Devices

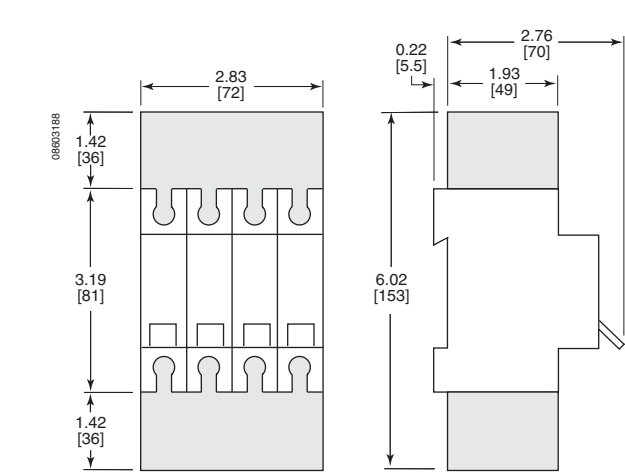
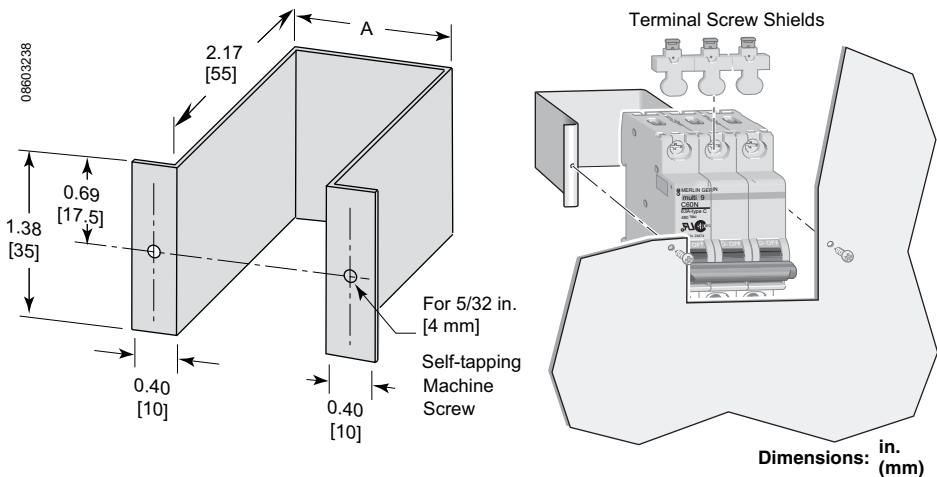


Figure 42: Front Mounting Bracket Kit



Dimension A			
No. of Poles	in.	mm	Catalog No.
Bracket for C60 (18 mm/pole)			
1	0.75	19	MG26983
2	1.46	37	MG26984
3	2.32	55	MG26985
4	2.87	73	MG26989
Bracket for C120 (27 mm/pole)			
1	1.10	28	MG26986
2	2.16	55	MG26987
3	3.23	82	MG26988
4	4.29	109	MG26990

Figure 43: Rotary Handle for C60 Devices

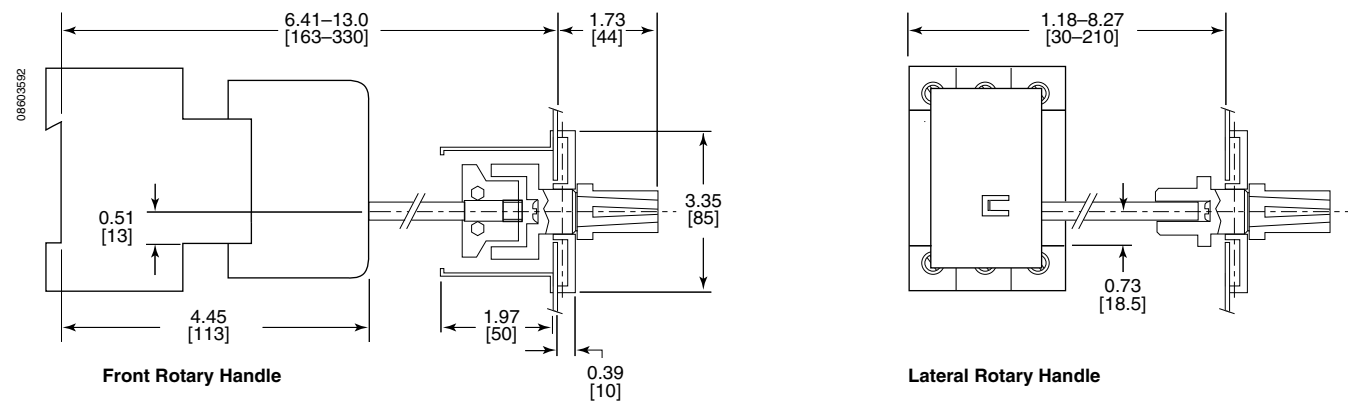


Figure 44: Comb Bus Bar Dimensions

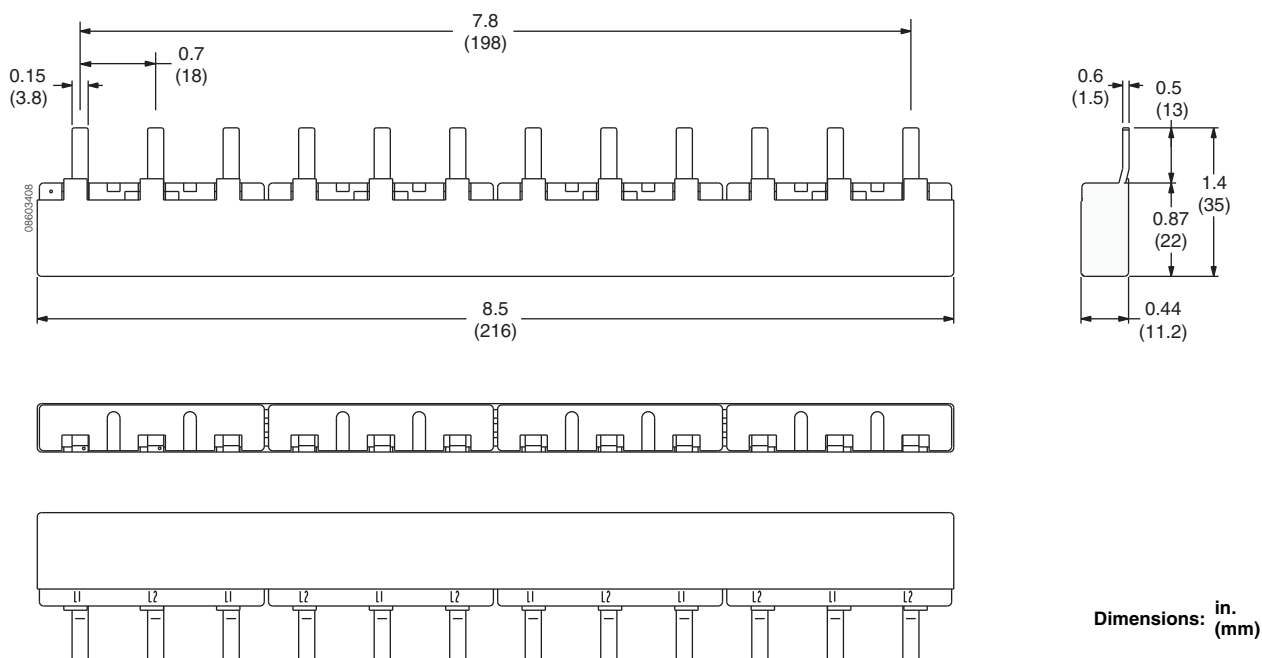
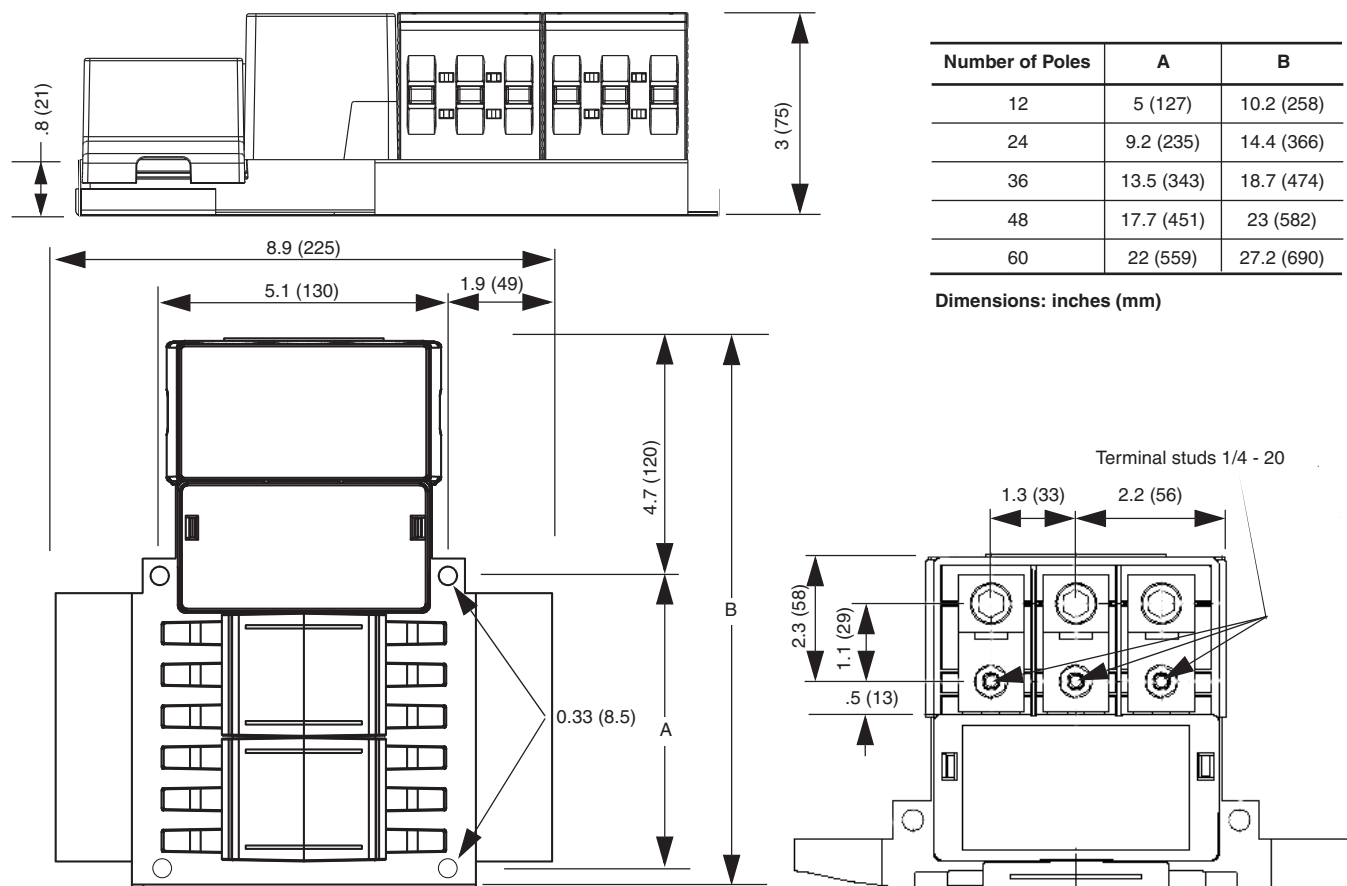


Figure 45: Multi 9 UL C60 Mounting Base



Multi 9™ System Catalog

Section 7—Dimensions

Figure 46: IEC MSC Chassis for C60 Devices

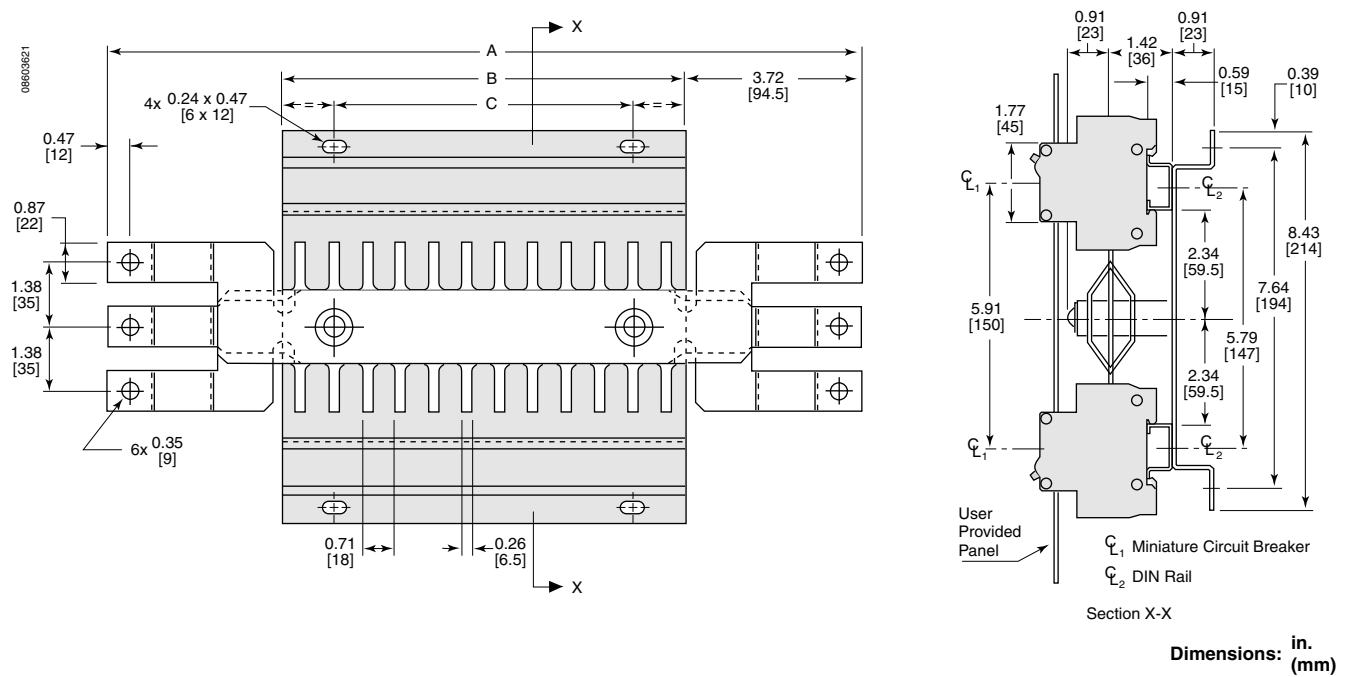


Table 80: MSC Chassis for C60 Devices

Type	No. of Poles	Dimensions					
		A ¹		B		C	
		in.	mm	in.	mm	in.	mm
MSC DC (for C60 2 pole)	12	11.7	299	4.33	110	2.13	54
	16	13.2	335	5.75	146	3.54	90
	20	14.6	371	7.17	182	4.57	116
MSC 18 (for C60 3 pole)	12	11.7	299	4.33	110	15.9	405
	18	13.9	353	6.46	164	8.58	218
	24	15.9	405	8.58	218	6.38	162
MSC 27 (for C120 3 pole)	12	17.0	432	9.57	162	4.25	108
	18	21.7	551	14.35	243	7.44	189
	24	26.5	673	19.13	324	10.63	270

¹ For TF suffix (top feed only), reduce length by 3.72 in. (94.5 mm).

Figure 47: Multi-Pole Front Mounting Kit for C60 Devices

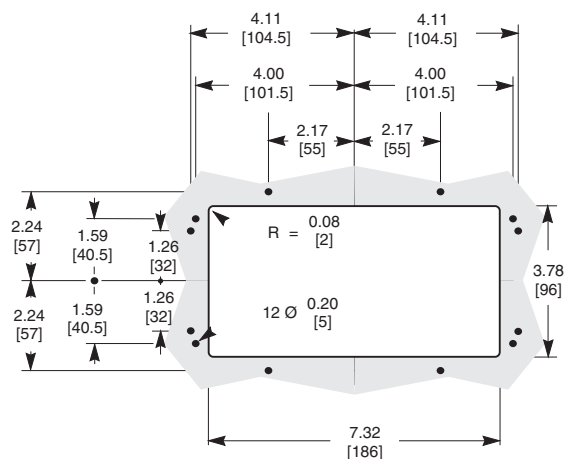
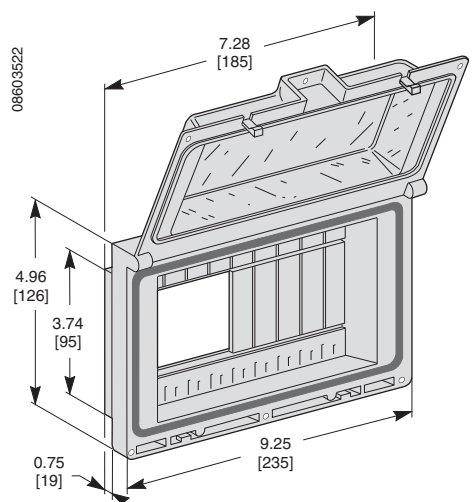
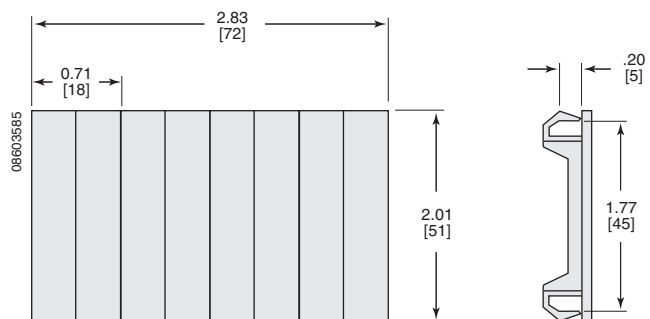
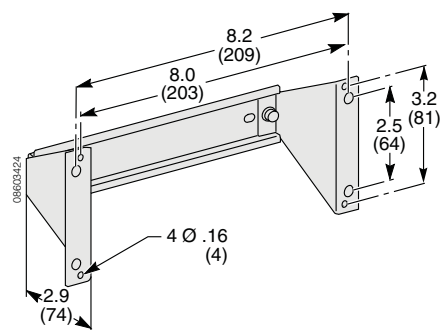


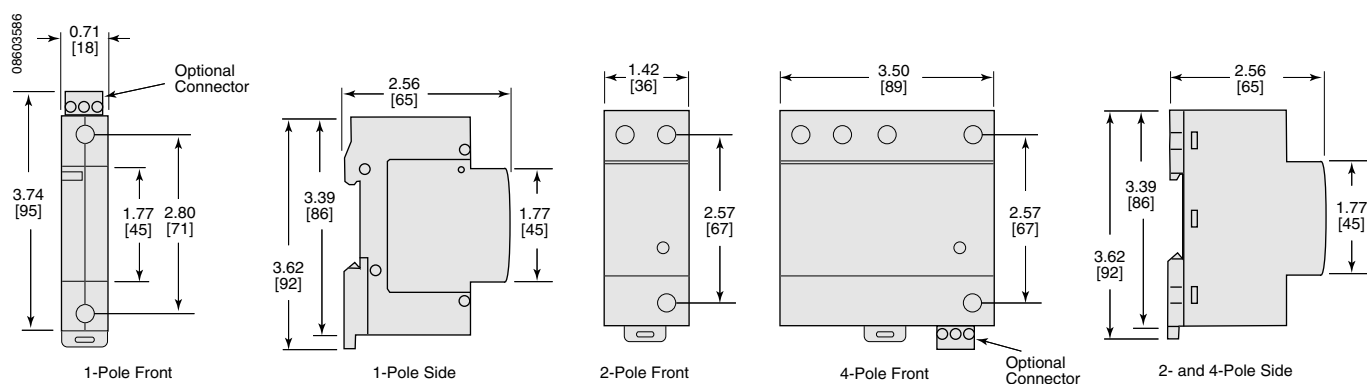
Figure 48: Bracket for Front Mounting Kit

Figure 49: M9PF4 Pole Filler



Dimensions: in.
(mm)

Figure 50: SPD Surge Protectors



Multi 9™ System Catalog
Section 7—Dimensions

Figure 51: CM Switches

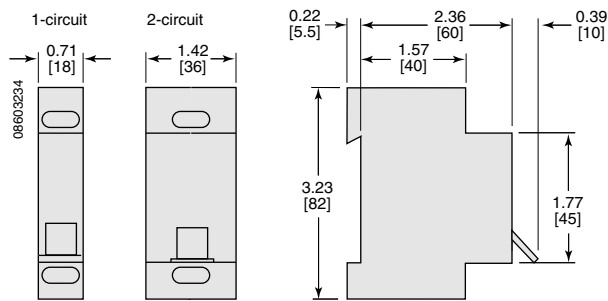


Figure 52: I Switch (20–32 A)

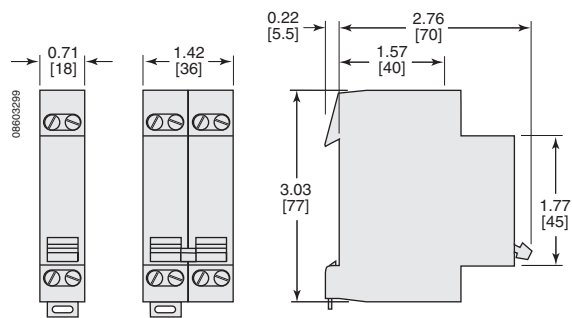


Figure 53: I Switch (40–125 A)

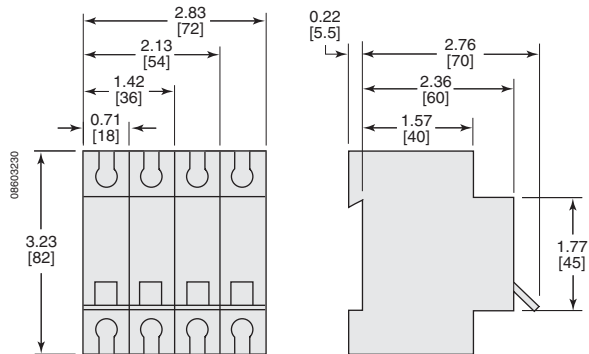
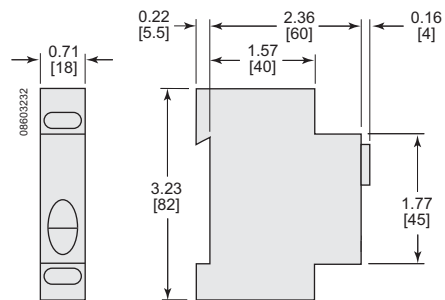


Figure 54: V Signal Lamps



Dimensions: in.
(mm)

Figure 55: BP Push Buttons

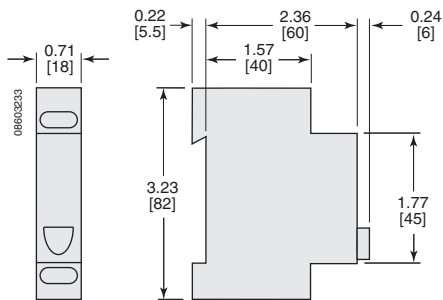


Figure 56: CH Hour Counter

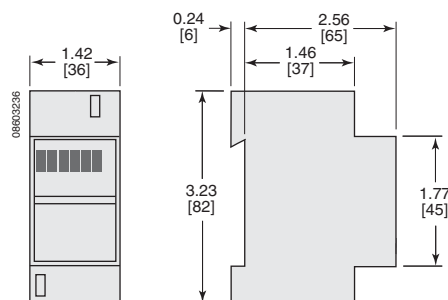
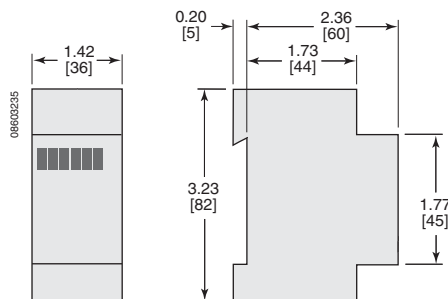


Figure 57: CI Impulse Counter



Kaedra™ Weatherproof Mini-Enclosure Dimensions

Table 81: Kaedra™ Weatherproof Mini-Enclosure Dimensions

No. of Modules	L		H		Weight		Cat. No.
	in	mm	in	mm	lbs	grams	
3	3.1	80	5.9	150	0.66	300	13956
4	4.8	123	7.9	200	0.99	450	13957
6	6.3	159	7.9	200	1.32	600	13958
8	7.7	195	7.9	200	1.76	800	13959
12	10.5	267	7.9	200	1.98	900	13960

Figure 58: Kaedra™ Weatherproof Mini-Enclosures

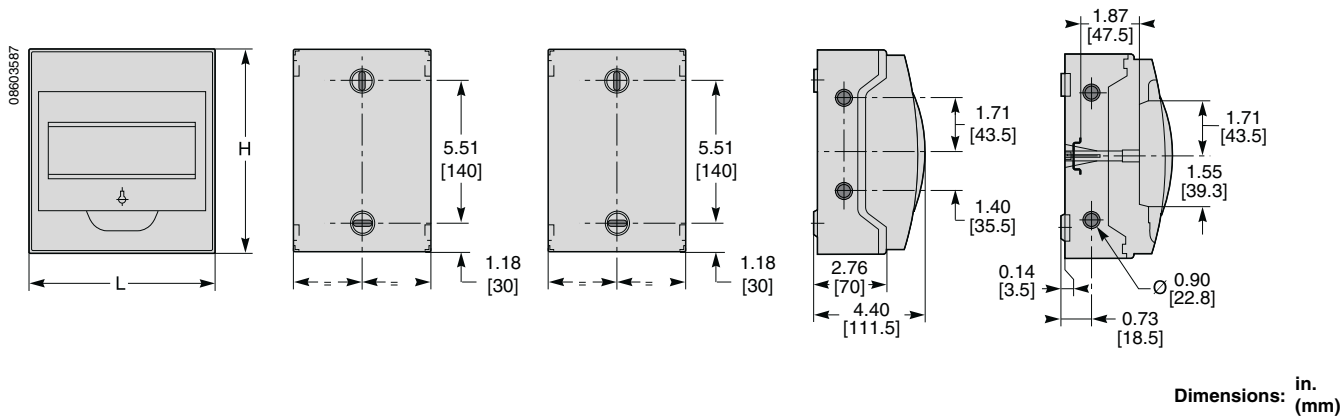
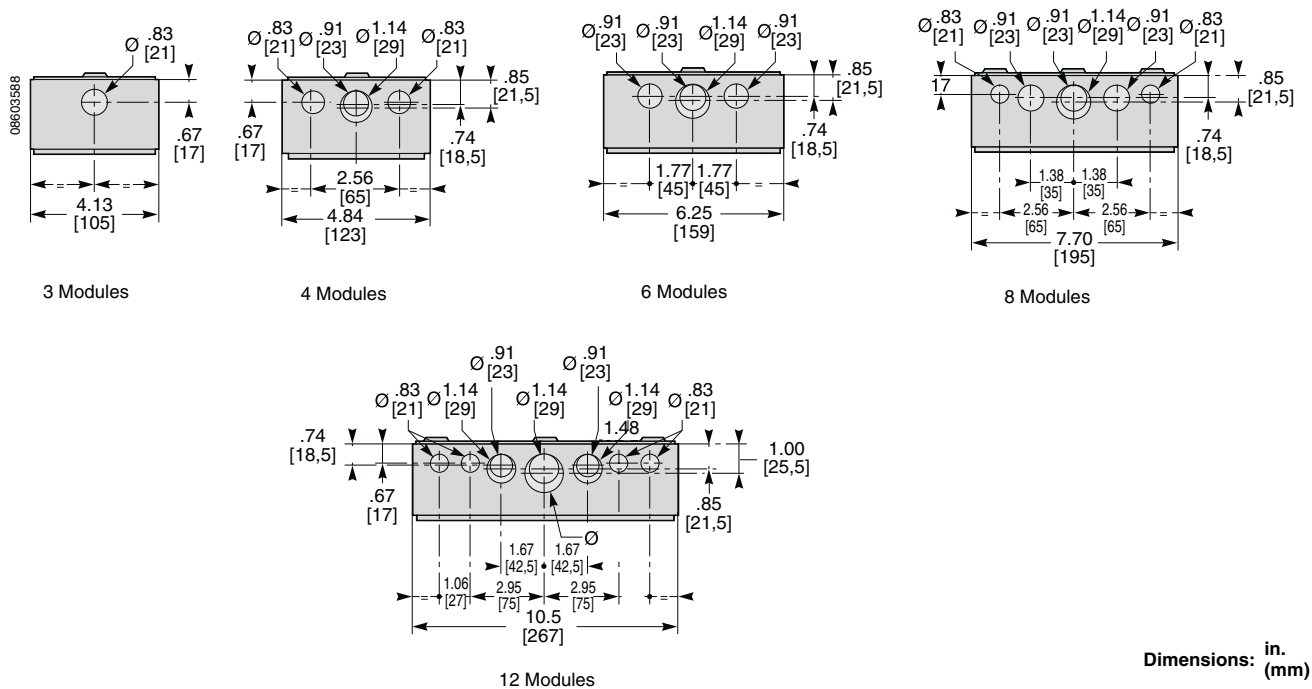


Figure 59: Top View for Kaedra™ Weatherproof Type Mini Enclosures



Kaedra™ Weatherproof Enclosures

Table 82: Kaedra™ Weatherproof Enclosure Dimensions (12 Module)

A		B		C		Weight		Cat. No.
in	mm	in	mm	in	mm	lbs	grams	
11.02	280	4.65	118	3.19	81	4.19	1900	13962
18.11	460	9.88	251	4.15	104.5	7.28	3300	13964
24.02	610	15.79	401	4.15	104.5	9.04	4100	13968

Figure 60: Kaedra™ Weatherproof Type Enclosures (12 Module)

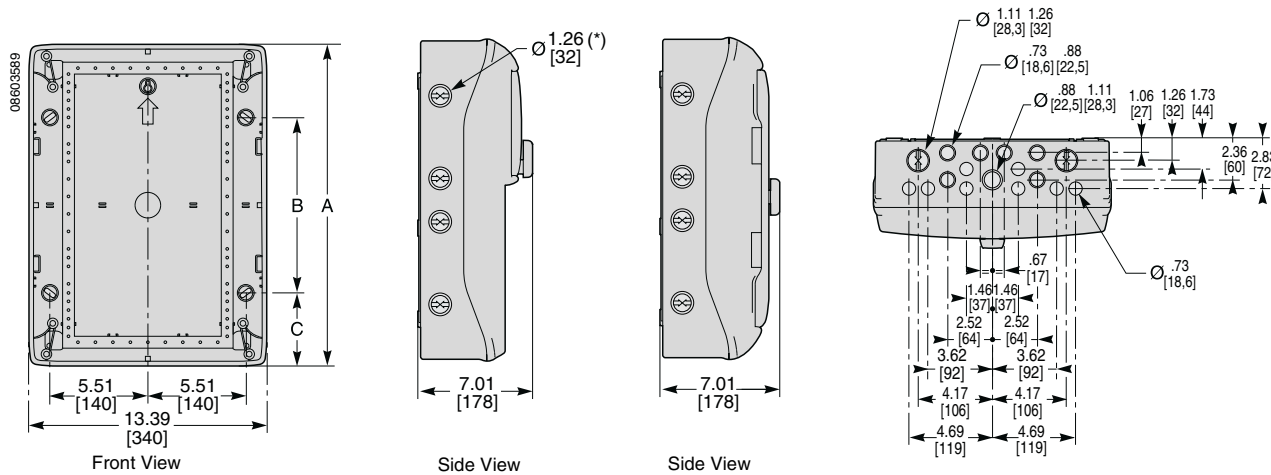


Table 83: Kaedra™ Weatherproof Enclosure Dimensions (18 Module)

A		B		C		Weight		Cat. No.
in	mm	in	mm	in	mm	lbs	grams	
11.02	280	4.65	118	3.19	81	5.29	2400	13963
18.11	460	9.88	251	4.15	104.5	9.04	4100	13965
24.02	610	15.79	401	4.15	104.5	12.35	5600	13967
33.15	842	24.92	633	4.15	104.5	14.55	6600	13968

Figure 61: Kaedra™ Weatherproof Type Enclosures (18 Module)

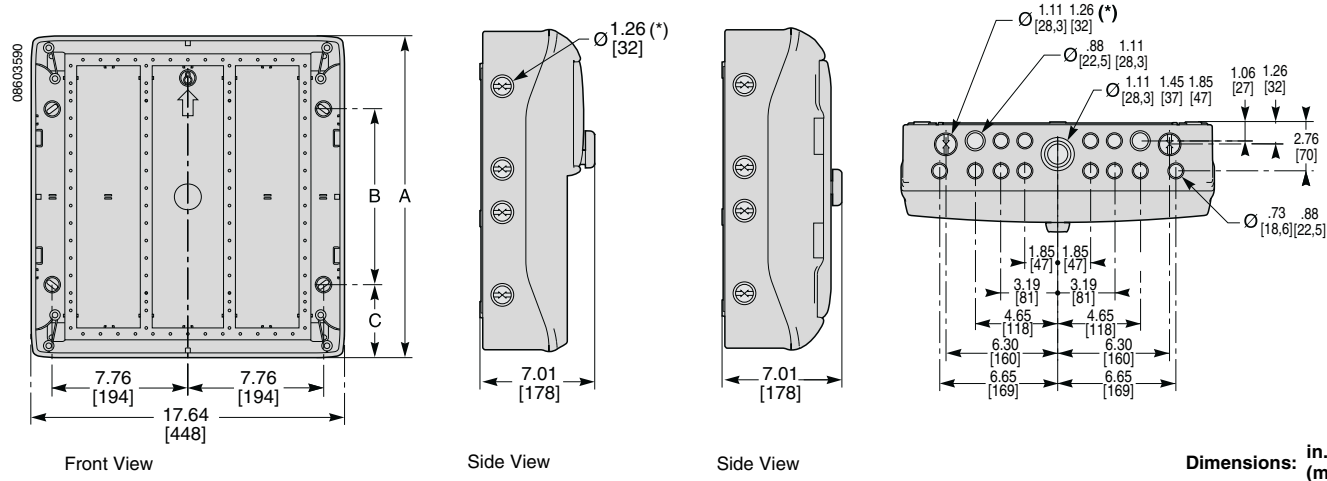
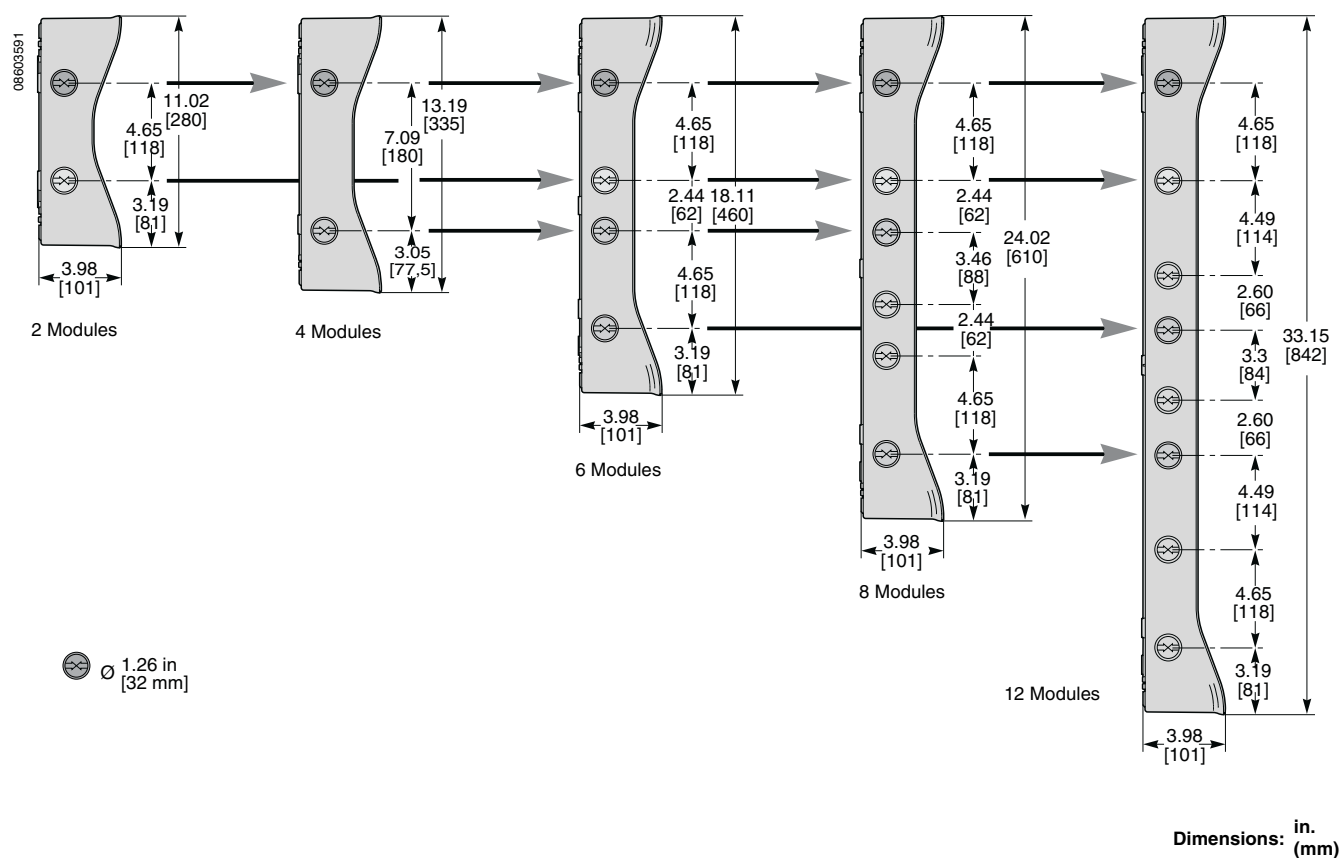


Table 84: Kaedra™ Cable Glands for Weatherproof Enclosures

Cable Size		Drilling Diameter		Thread Diameter	Pre-Punchout	Cat. No.
in	mm	in	mm	mm	mm	
0.354–0.433	9–11	0.740	18.8	18.6	PG 11	83992
0.354–0.472	9–12	0.815	20.7	20.4	PG 13.5	83993
0.394–0.512	10–13	0.898	22.8	22.5	PG 16	83994
0.551–0.669	14–17	1.125	28.6	28.3	PG 21	83995
0.748–1.024	19–26	1.472	37.4	37	PG 29	83996
1.102–1.417	28–36	1.870	47.5	47	PG 36	83997

Figure 62: Kaedra™ Horizontal Side-by-Side Interconnection References



Section 8—Applications

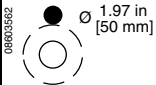
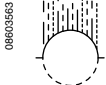
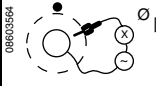
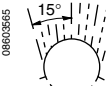
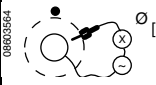
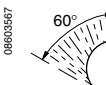
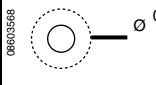
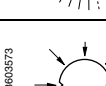
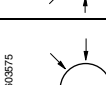
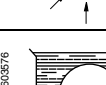
Degree of Protection (IP)

The IEC 529 Standard publication or the European EN 60529 Standard define the IP degree of protection characterizing the ability of a device to withstand the two external influences below:

- Ingress of solid bodies and protection of people
- Ingress of water

The IP contains two digits, one for each of these external influences, and is assigned to the device after a series of tests defined by the NF EN 60529 Standard. The IP degree of protection must always be read and understood digit by digit and not globally. The two IP digits may contain an optional letter which indicates the enclosure’s ability to protect people against access to live parts.

Table 85: Explanation of IP Degree of Protection Digits¹

First Digit Solid Body Protection			Second Digit Liquid Protection		Third Digit Mechanical Protection		
IP		Tests	IP		Tests	IK	
0		No protection	0		No protection	0	No protection
1		Protected against solid bodies larger than 1.97 in. (50 mm), e.g., accidental hand contact	1		Protected against vertically falling water droplets (condensation)	1	Impact energy 0.225 joules
2		Protected against solid bodies larger than 0.47 in. (12 mm), e.g., fingers	2		Protected against falling water droplets up to 15° from vertical	3	Impact energy 500 joules
3		Protected against solid bodies larger than 0.098 in. (2.5 mm), e.g., tools, wires	3		Protected against rainwater up to 60° from vertical	5	Impact energy 2.00 joules
4		Protected against solid bodies larger than 0.039 in. (1 mm), e.g., fine tools, small wires	4		Protected against water spray from all directions	7	Impact energy 6.00 joules
5		Protected against dust (no harmful deposit)	5		Protected against water splashes from all directions by jet pipes	9	Impact energy 20.00 joules
6		Completely protected against dust	6		Protected against water splashes/waves (of the heavy sea kind)		
			7		Protected against immersion effects		

¹ When mounted outdoors, the IP ≥ 54 enclosures must be equipped with a protectable top, or installed in a shelter.

The degrees of protection given in this catalog apply for enclosures as described here. However, the initial degree of protection can only be maintained if the device is properly assembled and installed.

Class 2: The term “double insulation” is also used. This consists of backing up the main insulation of an electrical device by an additional insulation in order to protect people against direct contact.

Vibration

Table 86: Vibration as per IEC 68.2.6 Standard¹

Curve	Sequence	Vibration
Curve B	Sequence S3: 0.14 oz. (4 g)	5–13 Hz: ±0.24 in. (6 mm) 13–300 Hz: 0.14 oz. (4 g)
Curve C and D	Sequence S6: 0.25 oz. (7 g)	5–58 Hz: ±0.02 in. (0.5 mm) 58–300 Hz: 0.25 oz. (7 g)

¹ Results depend on magnetic trip level. Five frequency sweeps per axis

Mechanical Shock (IK)

As per IEC 68.2.27 Standard: 1.06 oz./30 g, 18 ms., 3 shocks per axis

Standard EN 50.102 defines an IK code characterizing the ability of a device to withstand mechanical shocks. The IK code replaces the third digit of the old IP.

Protection of 400 Hz Circuits

The C60 and C120 miniature circuit breakers are designed to be applied on 50/60 Hz systems and can be re-rated for use on 400 Hz systems.

Table 87: 400 Hz Circuits

Type	No. of Poles	Interrupting Ratings (Vac)		
		240	277	480Y/277
C60N (0.5–63 A)	1P	4,000	3,000	—
	2P, 3P and 4P	4,000	—	3,000
C120H (50–80 A)	1P	3,000	—	—
	2P, 3P and 4P	3,000	—	—
C120H (10–40 A)	1P	5,000	4,000	—
	2P, 3P and 4P	5,000	—	4,000

- Thermal: No variation
- Magnetic increase in thresholds multiplier:
 - DPN-N: 1.50
 - C60N: 1.48
 - C120H: 1.40

Vigi ground-fault modules and residual current circuit breakers and switches can also be used on 400 Hz systems. Note in Figure 63 that the mA threshold varies according to system frequency.

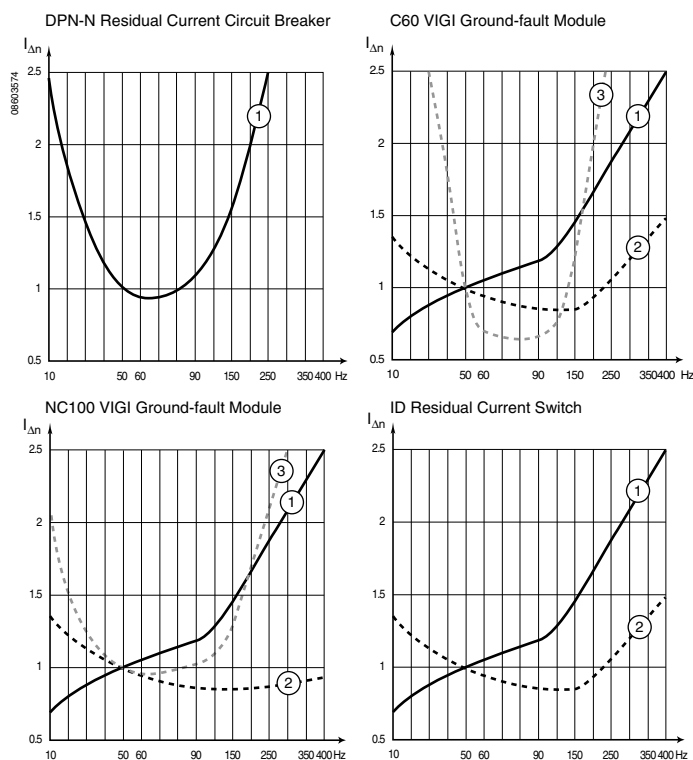
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Table 88: Curve Sensitivity at 400 Hz

Class	Rating (A)	Curve No. Sensitivity (mA)			
		10	30	100	300
DPN-N Residual Current Circuit Breakers					
AC	≤25	①	①	—	①
C60 Vigi Ground-Fault Module					
110/220 V, 50 Hz Vigi C60					
AC	≤25	②	①	①	—
	≤63	—	②	①	—
2P, 3P, 4P 220/415 V, 50 Hz Vigi C60					
AC	≤25	②	①	①	—
	≤63	—	②	①	—
AC	⑤	—	③	②	②
C120 Vigi Ground-Fault Module					
AC	≤100	—	③	—	①
AC	⑤ ≤100	—	②	②	②
ID Residual Current Switch					
AC	25	②	①	—	①
	25–40	—	①	①	①
	63–80–100	—	②	①	①
AC	⑤ 63–80–100	—	—	—	②

Figure 63: Protection of 400 Hz Circuits



Temperature Rating

Circuit breakers with uncompensated thermal tripping elements have a tripping-current level that depends on the surrounding temperature. If the circuit breaker is installed in an enclosure, or in a hot location (boiler room, etc.), the current required to trip the circuit breaker on overload will be reduced. When the ambient temperature exceeds the circuit breaker reference temperature, the supplementary protector or circuit breaker will be “de-rated.” For this reason, circuit breaker manufacturers provide tables which indicate factors to apply at temperatures different from the supplementary protector or circuit breaker reference temperature. It should be noted from typical examples of such tables that an ambient temperature lower than the rated temperature produces an “up-rating” of the supplementary protector or circuit breaker.

When several simultaneously operating circuit breakers are mounted side-by-side in a small enclosure, the temperature rise in the enclosure causes a reduction in current rating. Mutual heating generally requires an additional de-rating coefficient of 0.8.

Table 89: Rated Temperatures for UL Listed Circuit Breakers and UL Recognized C60 Supplementary Protectors

Ampere Ratings	-22°F -30°C	-13°F -25°C	-4°F -20°C	5°F -15°C	14°F -10°C	23°F -5°C	32°F 0°C	41°F 5°C	50°F 10°C	59°F 15°C	68°F 20°C	77°F 25°C	86°F 30°C	104°F 40°C	122°F 50°C	140°F 60°C	158°F 70°C
0.5	1.26	1.24	1.22	1.20	1.17	1.15	1.13	1.10	1.08	1.05	1.03	1.00	0.97	0.92	0.85	0.79	0.72
1	1.21	1.19	1.18	1.16	1.14	1.12	1.10	1.08	1.06	1.04	1.02	1.00	0.98	0.93	0.89	0.84	0.79
1.2	1.26	1.24	1.22	1.20	1.17	1.15	1.13	1.10	1.08	1.05	1.03	1.00	0.97	0.92	0.85	0.79	0.72
1.5	1.32	1.29	1.27	1.24	1.21	1.19	1.16	1.13	1.10	1.07	1.03	1.00	0.97	0.89	0.81	0.73	0.63
2	1.21	1.19	1.18	1.16	1.14	1.12	1.10	1.08	1.06	1.04	1.02	1.00	0.98	0.93	0.89	0.84	0.79
3	1.27	1.25	1.22	1.20	1.18	1.15	1.13	1.11	1.08	1.05	1.03	1.00	0.97	0.91	0.85	0.78	0.71
4	1.25	1.23	1.21	1.19	1.17	1.15	1.12	1.10	1.07	1.05	1.03	1.00	0.97	0.92	0.86	0.80	0.73
5	1.26	1.24	1.22	1.19	1.17	1.15	1.13	1.10	1.08	1.05	1.03	1.00	0.97	0.92	0.86	0.79	0.72
6	1.23	1.21	1.19	1.17	1.15	1.13	1.11	1.09	1.07	1.05	1.02	1.00	0.98	0.93	0.87	0.82	0.76
7	1.29	1.26	1.24	1.22	1.19	1.17	1.14	1.11	1.09	1.06	1.03	1.00	0.97	0.91	0.84	0.76	0.68
8	1.29	1.26	1.24	1.22	1.19	1.17	1.14	1.11	1.09	1.06	1.03	1.00	0.97	0.91	0.84	0.76	0.68
10	1.28	1.25	1.23	1.21	1.18	1.16	1.13	1.11	1.08	1.06	1.03	1.00	0.97	0.91	0.85	0.78	0.70
13	1.20	1.18	1.16	1.15	1.13	1.11	1.09	1.08	1.06	1.04	1.02	1.00	0.98	0.94	0.90	0.85	0.80
15	1.28	1.25	1.23	1.21	1.18	1.16	1.13	1.11	1.08	1.06	1.03	1.00	0.97	0.91	0.85	0.78	0.70
16	1.24	1.22	1.20	1.18	1.16	1.14	1.11	1.09	1.07	1.05	1.02	1.00	0.98	0.93	0.87	0.81	0.75
20	1.23	1.21	1.19	1.17	1.15	1.13	1.11	1.09	1.07	1.05	1.02	1.00	0.98	0.93	0.87	0.82	0.76
25	1.24	1.22	1.20	1.18	1.16	1.14	1.11	1.09	1.07	1.05	1.02	1.00	0.98	0.93	0.87	0.81	0.75
30	1.30	1.27	1.25	1.22	1.20	1.17	1.15	1.12	1.09	1.06	1.03	1.00	0.97	0.90	0.83	0.75	0.66
32	1.23	1.21	1.19	1.17	1.15	1.13	1.11	1.09	1.07	1.04	1.02	1.00	0.98	0.93	0.88	0.82	0.77
35	1.31	1.29	1.26	1.23	1.21	1.18	1.15	1.12	1.09	1.06	1.03	1.00	0.97	0.90	0.82	0.74	0.64
40	1.23	1.21	1.19	1.17	1.15	1.13	1.11	1.09	1.07	1.05	1.02	1.00	0.98	0.93	0.88	0.82	0.76
50	1.23	1.21	1.19	1.17	1.15	1.13	1.11	1.09	1.07	1.05	1.02	1.00	0.98	0.93	0.88	0.82	0.76
60	1.29	1.27	1.24	1.22	1.19	1.17	1.14	1.11	1.09	1.06	1.03	1.00	0.97	0.90	0.84	0.76	0.67
63	1.27	1.25	1.22	1.20	1.18	1.15	1.13	1.11	1.08	1.05	1.03	1.00	0.97	0.91	0.85	0.78	0.71

NOTE: The UL 489/CSA C22.2 No.5 Listed Multi 9 C60 circuit breakers are calibrated at 77°F (25°C), unlike some other UL 489/CSA 22.2 No.5 circuit breakers which are calibrated at 104°F (40°C). Depending on the operating environment, you may need to derate according to these tables to determine the appropriate handle rating.

NOTE: UL 489/CSA C22.2 No.5 Listed circuit breakers should be loaded to no more than 80% if used with continuous loads.

Table 90: Rated Temperatures for IEC Rated DPN-N Circuit Breakers

Ampere Rating (A)	68°F 20°C	77°F 25°C	86°F 30°C	95°F 35°C	104°F 40°C	113°F 45°C	122°F 50°C	131°F 55°C	140°F 60°C
1	1.04	1.02	1.00	0.98	0.96	0.93	0.91	0.89	0.86
2	1.04	1.02	1.00	0.98	0.96	0.94	0.91	0.89	0.86
3	1.04	1.02	1.00	0.97	0.94	0.92	0.89	0.86	0.82
6	1.04	1.02	1.00	0.98	0.96	0.93	0.91	0.89	0.86
10	1.05	1.03	1.00	0.97	0.95	0.92	0.89	0.86	0.83
16	1.05	1.02	1.00	0.98	0.95	0.93	0.90	0.87	0.85
20	1.05	1.02	1.00	0.98	0.95	0.93	0.90	0.88	0.85
25	1.04	1.02	1.00	0.98	0.95	0.93	0.91	0.88	0.86
32	1.05	1.03	1.00	0.97	0.95	0.92	0.89	0.86	0.83
40	1.05	1.03	1.00	0.97	0.95	0.92	0.89	0.86	0.83

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Table 91: Rated Temperature for IEC Rated C60H (C Curve) and C60L (B and C Curve) Circuit Breakers

Ampere Rating (A)	68°F 20°C	77°F 25°C	86°F 30°C	95°F 35°C	104°F 40°C	113°F 45°C	122°F 50°C	131°F 55°C	140°F 60°C
1	1.05	1.02	1.00	0.98	0.95	0.93	0.90	0.88	0.85
2	1.04	1.02	1.00	0.98	0.96	0.94	0.92	0.90	0.87
3	1.06	1.03	1.00	0.97	0.94	0.90	0.87	0.83	0.79
4	1.06	1.03	1.00	0.97	0.94	0.91	0.88	0.84	0.81
6	1.04	1.02	1.00	0.98	0.96	0.94	0.92	0.90	0.88
10	1.06	1.03	1.00	0.97	0.93	0.90	0.86	0.82	0.78
16	1.05	1.03	1.00	0.97	0.95	0.92	0.89	0.86	0.83
20	1.05	1.03	1.00	0.97	0.95	0.92	0.89	0.87	0.84
25	1.05	1.03	1.00	0.97	0.95	0.92	0.89	0.86	0.83
32	1.05	1.03	1.00	0.98	1.19	0.93	0.89	0.88	0.86
40	1.05	1.03	1.00	0.97	0.95	0.92	0.89	0.86	0.81
50	1.05	1.03	1.00	0.97	0.95	0.91	0.88	0.85	0.81
63	1.05	1.03	1.00	0.97	0.92	0.90	0.86	0.82	0.78

Table 92: Rated Temperatures for IEC Rated C60 (D Curve) and C60L (B, C, Z and K Curve) Circuit Breakers

Ampere Rating (A)	68°F 20°C	77°F 25°C	86°F 30°C	95°F 35°C	104°F 40°C	113°F 45°C	122°F 50°C	131°F 55°C	140°F 60°C
1	1.10	1.08	1.05	1.03	1.00	0.97	0.95	0.92	0.89
2	1.09	1.07	1.04	1.02	1.00	0.98	0.95	0.93	0.90
3	1.14	1.10	1.07	1.04	1.00	0.96	0.92	0.88	0.84
4	1.13	1.10	1.06	1.03	1.00	0.97	0.93	0.89	0.86
6	1.08	1.06	1.04	1.02	1.00	0.98	0.96	0.93	0.91
10	1.14	1.11	1.07	1.04	1.00	0.96	0.92	0.88	0.84
16	1.12	1.09	1.06	1.03	1.00	0.97	0.94	0.90	0.87
20	1.11	1.08	1.06	1.03	1.00	0.97	0.94	0.91	0.88
25	1.11	1.08	1.06	1.03	1.00	0.97	0.94	0.91	0.87
32	1.10	1.07	1.05	1.03	1.00	0.97	0.95	0.92	0.89
40	1.11	1.09	1.06	1.03	1.00	0.97	0.94	0.91	0.87
50	1.12	1.09	1.06	1.03	1.00	0.97	0.93	0.90	0.86
63	1.14	1.11	1.07	1.04	1.00	0.96	0.92	0.88	0.84

Table 93: Rated Temperatures for IEC Rated C120 Circuit Breakers

Ampere Rating (A)	68°F 20°C	77°F 25°C	86°F 30°C	95°F 35°C	104°F 40°C	113°F 45°C	122°F 50°C	131°F 55°C	140°F 60°C
10	1.10	1.07	1.05	1.03	1.00	0.95	0.90	0.87	0.85
16	1.06	1.03	1.00	1.00	1.00	0.97	0.94	0.91	0.88
20	1.13	1.10	1.05	1.03	1.00	0.95	0.93	0.90	0.85
25	1.08	1.06	1.04	1.02	1.00	0.96	0.92	0.90	0.88
32	1.13	1.09	1.06	1.03	1.00	0.97	0.92	0.88	0.84
40	1.14	1.10	1.08	1.04	1.00	0.96	0.93	0.88	0.84
50	1.15	1.12	1.08	1.04	1.00	0.96	0.91	0.87	0.82
63	1.15	1.12	1.08	1.04	1.00	0.96	0.91	0.87	0.82
80	1.15	1.11	1.08	1.04	1.00	0.96	0.92	0.87	0.83
100	1.15	1.12	1.08	1.04	1.00	0.96	0.92	0.87	0.83
125	1.12	1.10	1.08	1.04	1.00	0.96	0.90	0.86	0.82

Typical IEC Grounding Systems

All electrical installations complying with safety standards and regulations are grounded in order to protect people and equipment. The term “grounding system” standardizes the grounding method used in the installation. The grounding system runs:

- First, from the neutral of the secondary side of the transformer,
- Next, from the installation frames.

The IEC 364 (Section 3) Standard defines three types of grounding systems: TT, IT and TN-C or TN-S.

Codification of the Grounding Systems

Grounding systems are referred to by two or three letters **T** **N** **S** for example:

- 1st letter—Status of the neutral of the transformer or source:
 - I: Ungrounded
 - T: Grounded
- 2nd letter—Status of the electrical frames of the loads:
 - T: Grounded
 - N: Connected to neutral
- 3rd letter—Status of the neutral (N) and the protective conductor (PE):
 - S: N and PE are separate
 - C: N and PE are in the same conductor (PEN)

The TT Grounded Neutral System

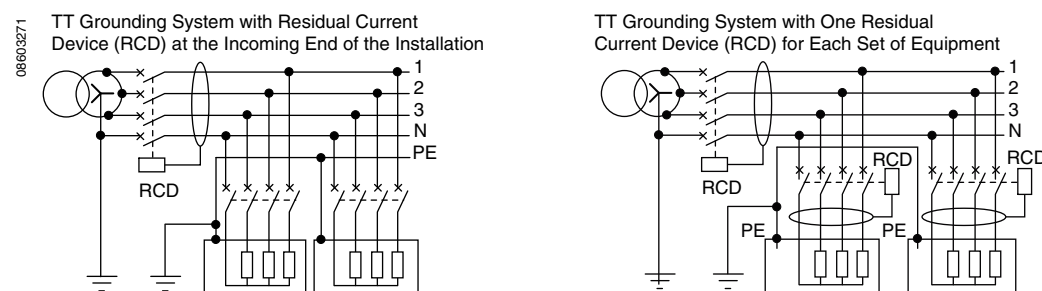
This “directly-grounded neutral” system is the easiest to install, monitor and use. Main features are:

- The neutral point of the distribution transformer is directly grounded.
- The installation frames are connected to several ground connections by the PE protective conductor.
- The frame and neutral ground connections are separate.

System characteristics upon installation:

- Tripping is compulsory on the first fault.
- Thus, at least one RCD is necessary at the incoming end of the installation.
- If the load frames are not all connected to the same grounding connection, one RCD must be installed for each set of equipment.

Figure 64: TT Grounding Systems



The IT Grounding System

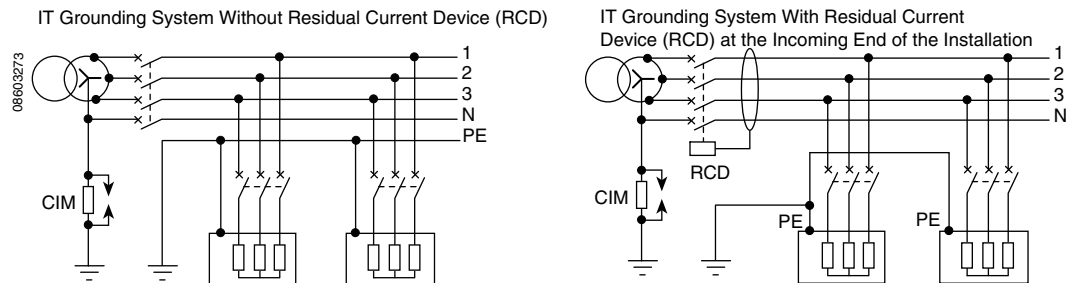
This “ungrounded neutral” system has the following main features:

- The neutral point of the distribution transformer is ungrounded, or grounded by a high impedance
- The installation frames are connected to the same grounding connection by the PE protective conductor

System characteristics and constraints upon installation:

- The appearance of the first insulation fault is risk-free for people.
- The appearance of the second insulation fault is dangerous to people, and thus requires tripping.
- If the application frames and the transformer frame are not all connected to the same ground connection, an RCD must be placed at the incoming end of the installation.
- The standard stipulates the installation of a Continuous Insulation Monitor (CIM) at the incoming end of the installation.

Figure 65: IT Grounding Systems



The TN-S Grounding System

This “multiple-grounded neutral” system has the following main features:

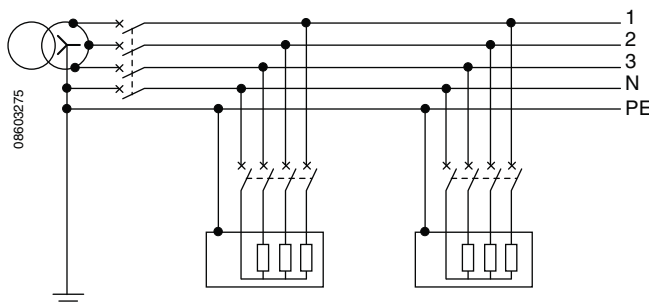
- The neutral point of the distribution transformer is grounded.
- All installation frames are grounded by a PE protective conductor.
- The PE protective conductors and the N neutral conductor are separate.

System characteristics and constraints upon installation:

- Allows tripping on the first fault via an overcurrent protection device.
- Use of an RCD, although not compulsory, is recommended.
- Requires calculation, sometimes complex, of loop impedance.
- Tripping of the protection devices must be checked when these devices are installed, B curve is recommended.

NOTE: This grounding system is compulsory on premises where there is a risk of explosion

Figure 66: TN-S Grounding System



Section 9—Time/Current Curves

UL 489/CSA C22.2 No. 5 and UL 489A Listed C60 Miniature Circuit Breakers

Figure 67: UL 489/CSA C22.2 No.5 Listed C60—C Curve (0.5–35 A) AC & DC

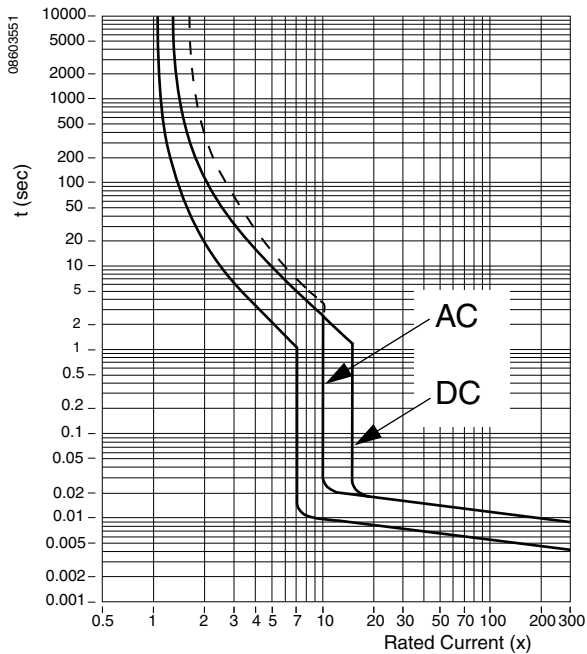


Figure 68: UL 489/CSA C22.2 No.5 Listed C60—D Curve (0.5–35 A) AC

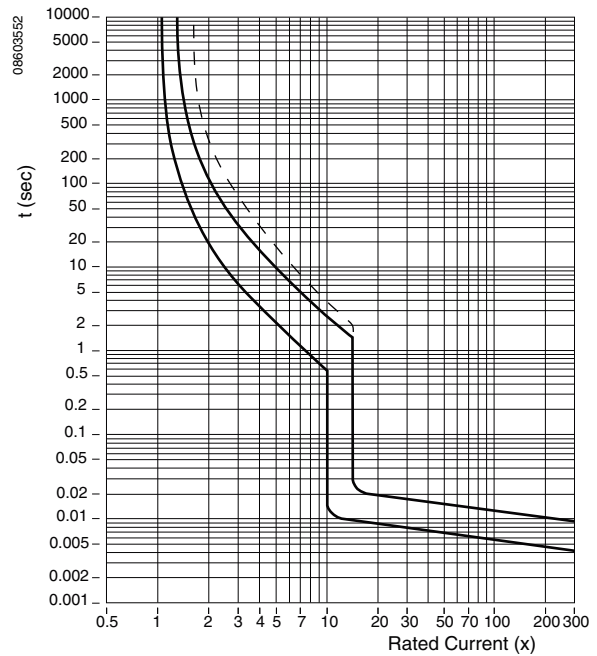
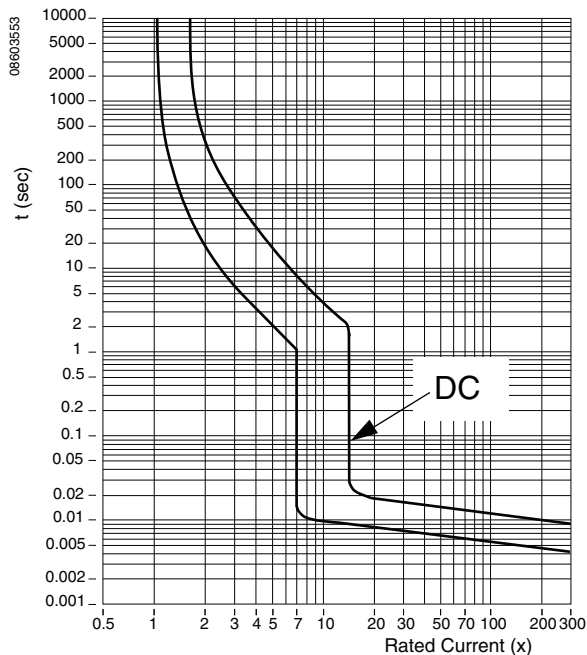


Figure 69: UL 489/CSA C22.2 No.5 Listed C60—C Curve (0.5–35 A) DC



UL 1077 Recognized Supplementary Protectors¹

Figure 70: UL 1077 Recognized C60—B Curve

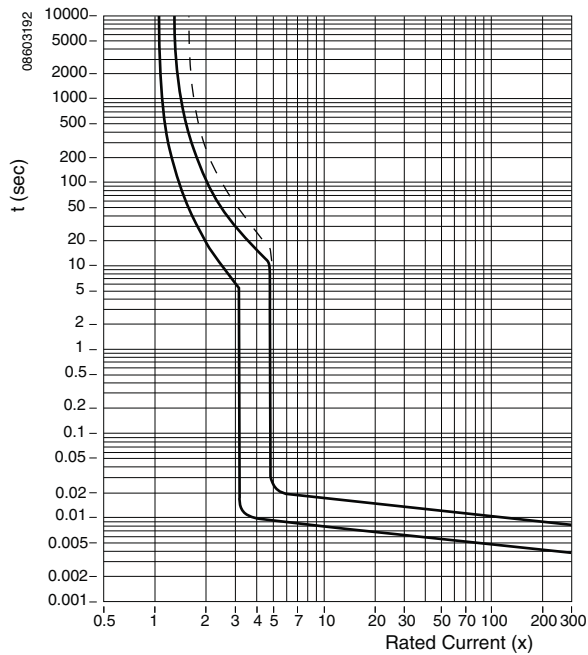


Figure 71: UL 1077 Recognized C60—C Curve

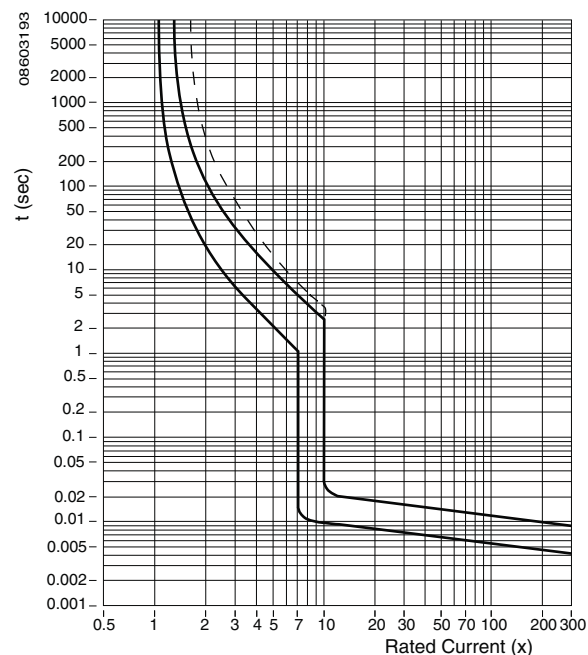
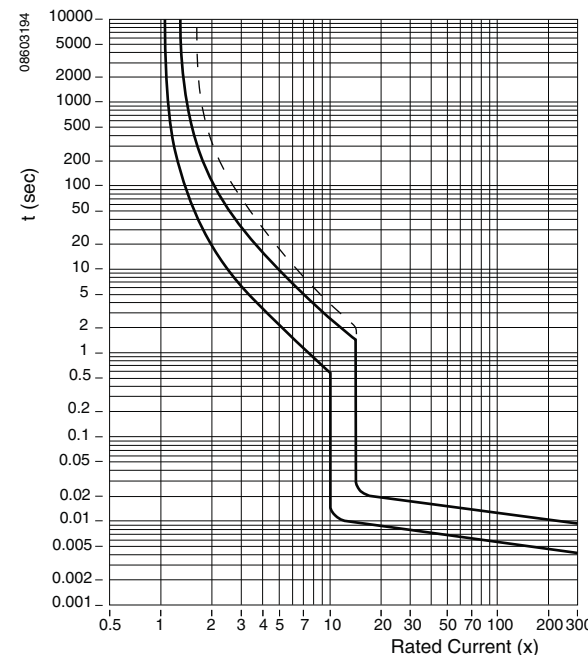


Figure 72: UL 1077 Recognized C60—D Curve



¹ Dotted Line is the tripping limit of a single pole of multi-pole device.

IEC 60947-2 Rated DPN-N Circuit Breakers

Figure 73: IEC Rated DPN-N—B Curve

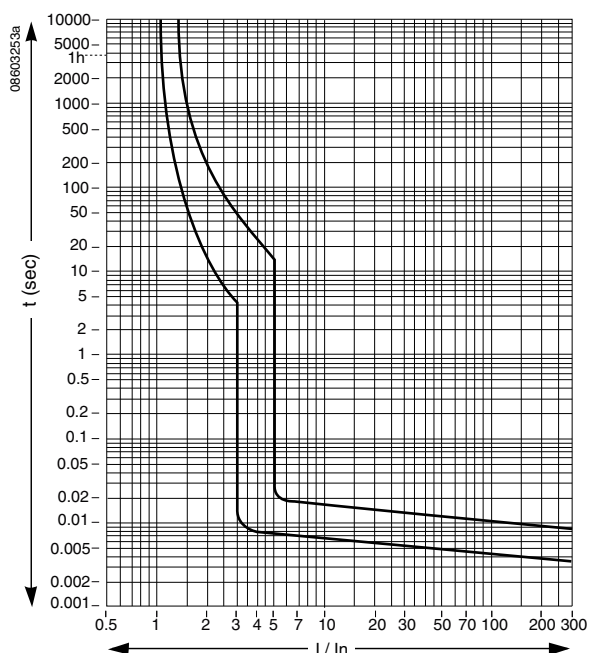
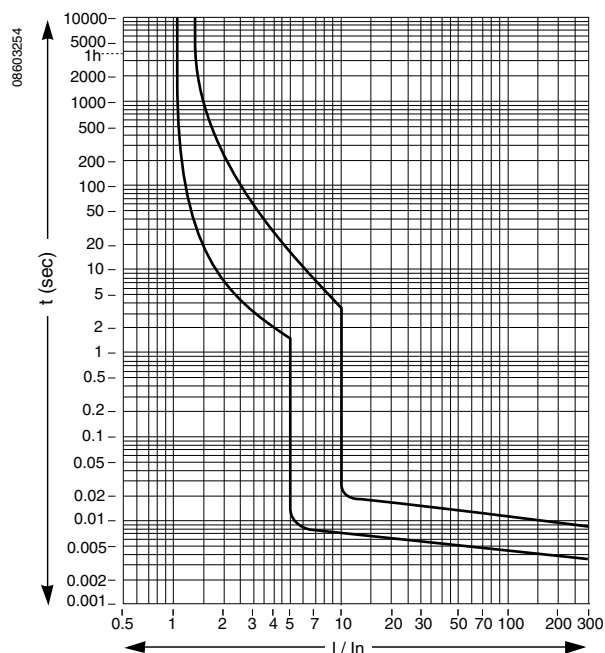


Figure 74: IEC Rated DPN-N—C Curve



IEC 60947-2 Rated C60N/H/L Circuit Breakers

Figure 75: IEC Rated C60N/H/L—B Curve

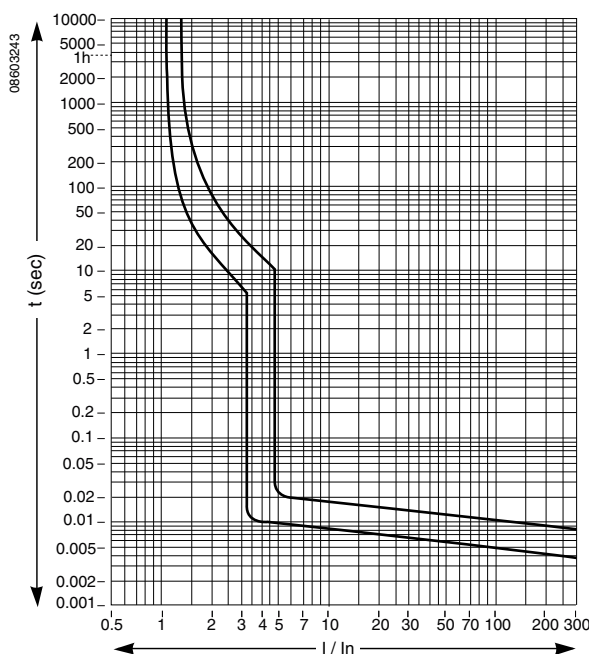
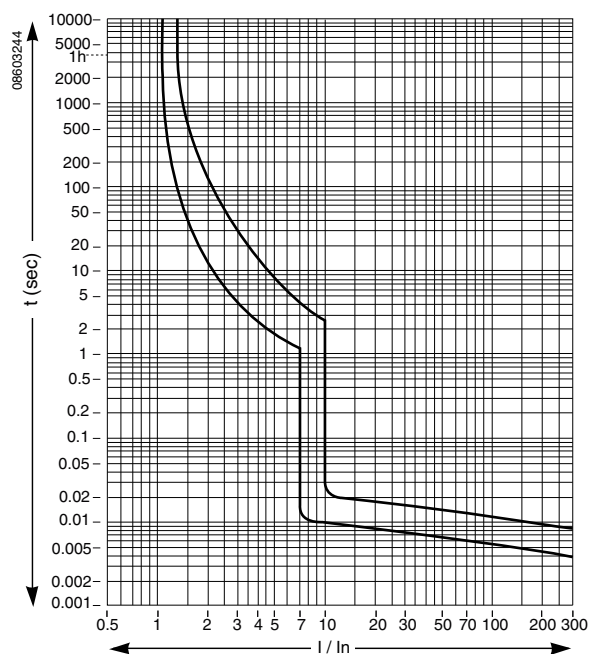


Figure 76: IEC Rated C60N/H/L—C Curve



NOTE: The above time/current curves show the cold thermal tripping limits when the poles are charged and show the electromagnetic tripping limits with two charged poles.

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Section 9—Time/Current Curves

Figure 77: IEC Rated C60N/H—D Curve

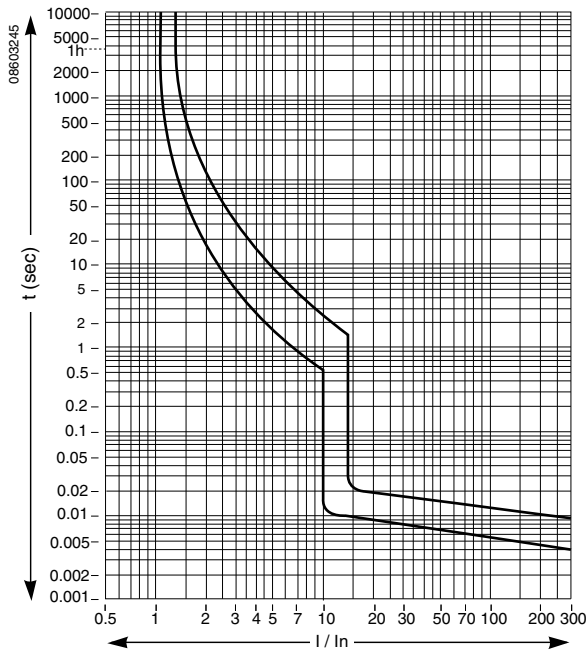


Figure 78: IEC Rated C60L—K Curve

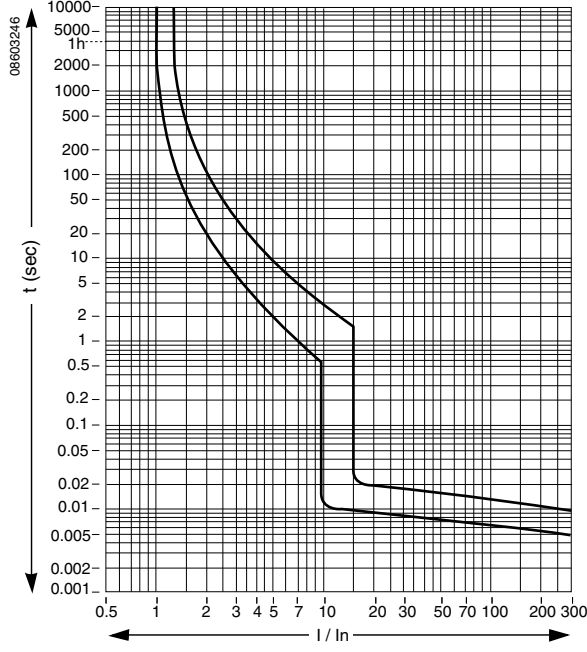


Figure 79: IEC Rated C60L-MA—MA Curve

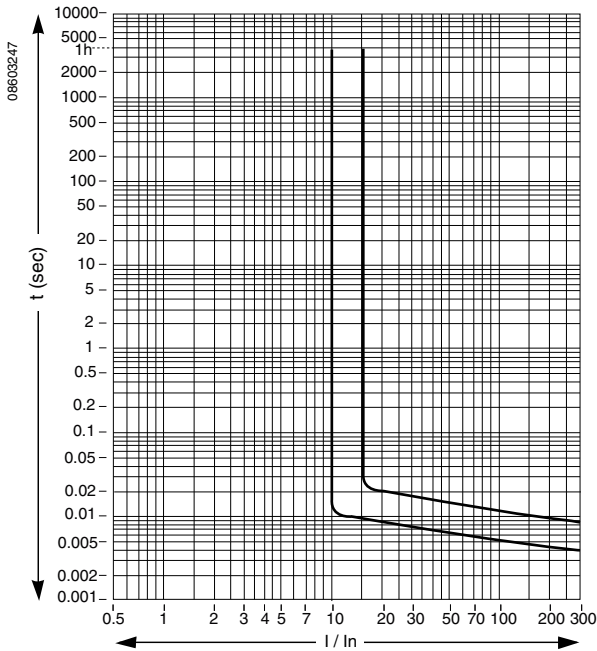
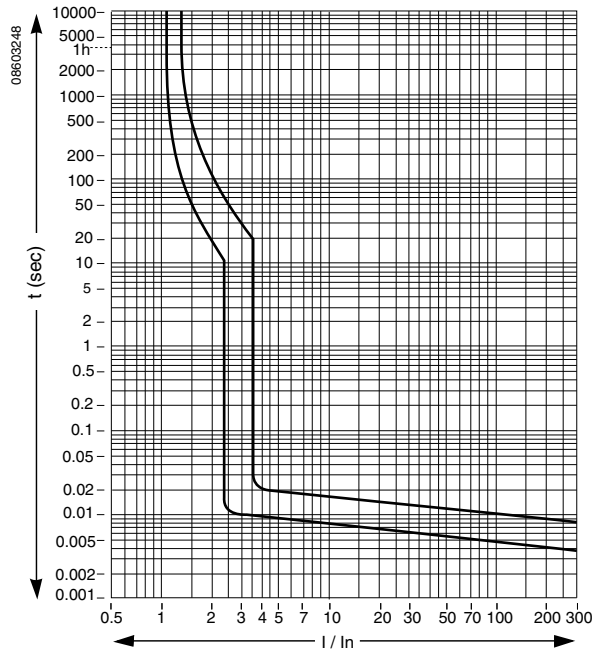


Figure 80: IEC Rated C60L—Z Curve



Section 10—Let-Through Curves

UL Listed C60 Miniature Circuit Breakers and UL Recognized C60 Supplementary Protectors

Figure 81: UL 489/CSA C22.2 No.5/489A Listed and UL 1077 Recognized C60 1P (240 Vac) Max Let-Through Peak Current

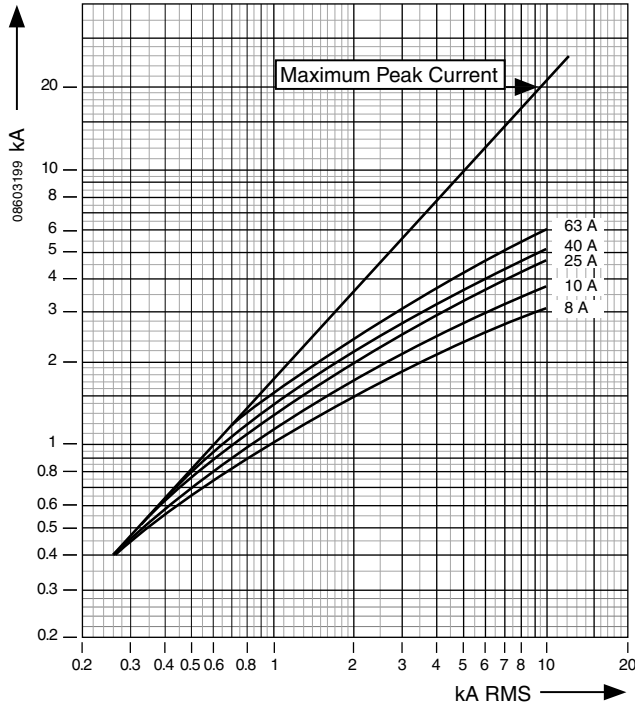
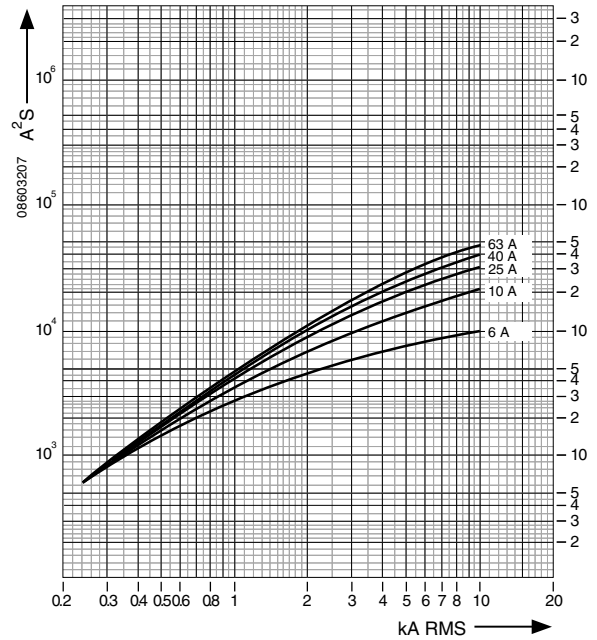


Figure 82: UL 489/CSA C22.2 No.5/489A Listed and UL 1077 Recognized C60 1P (240 Vac) Max Let-Through I^2t Current



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Figure 83: UL 489/CSA C22.2 No.5 Listed and UL 1077 Recognized C60 2P, 3P, and 4P (240 Vac) Max Let-Through Peak Current

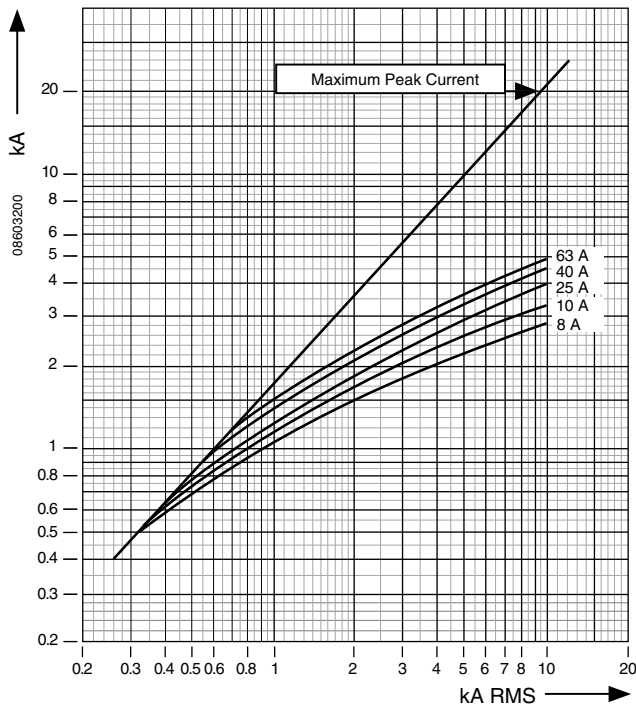


Figure 84: UL 489/CSA C22.2 No.5 Listed and UL 1077 Recognized C60 2P, 3P, and 4P (240 Vac) Max I^2t Peak Current

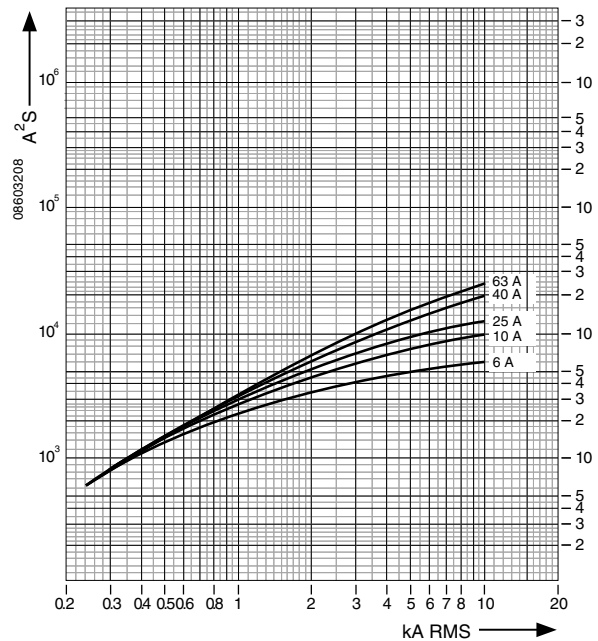


Figure 85: UL 489/CSA C22.2 No.5 Listed and UL 1077 Recognized C60 1P (277 Vac) Maximum Let-Through Peak Current

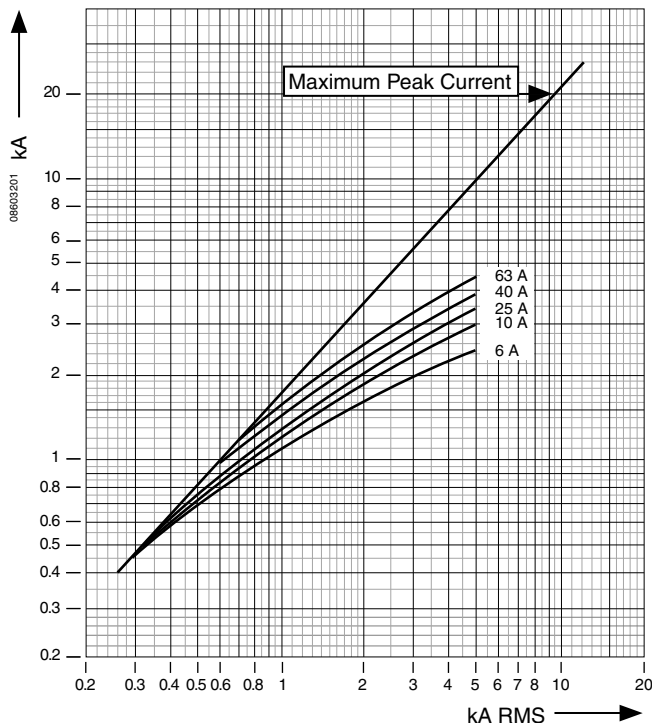


Figure 86: UL 489/CSA C22.2 No.5 Listed and UL 1077 Recognized C60 1P (277 Vac) Maximum I^2t Peak Current

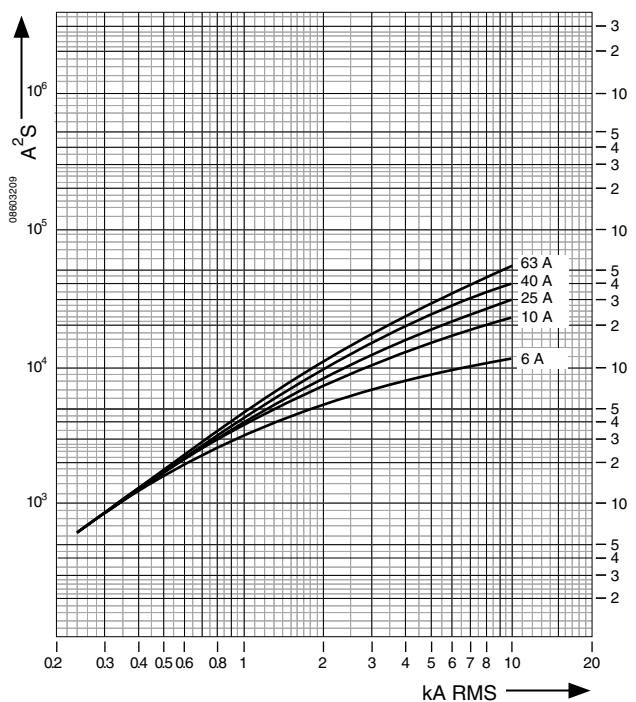


Figure 87: UL 1077 Recognized C60 2P, 3P, and 4P (480Y/277 Vac) Maximum Let-Through Peak Current

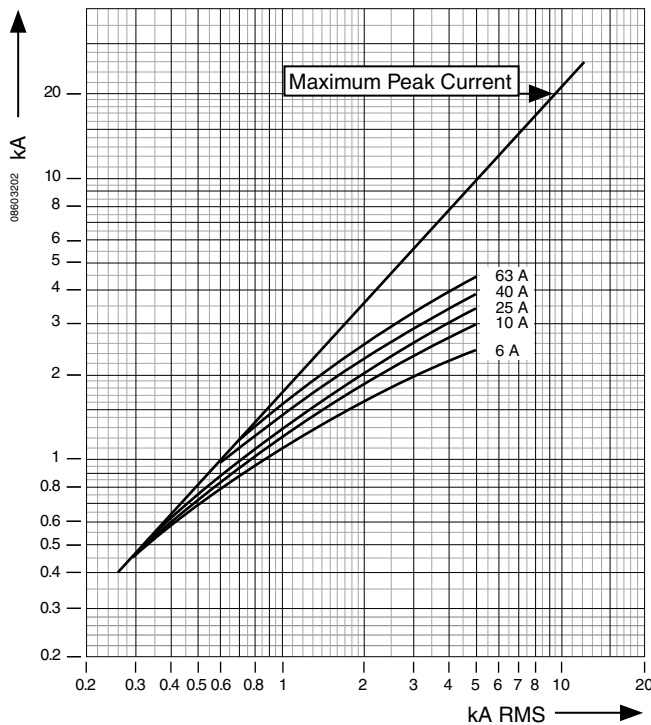


Figure 88: UL 1077 Recognized C60 2P, 3P, and 4P (480Y/277 Vac) Maximum Let-Through I²t Current

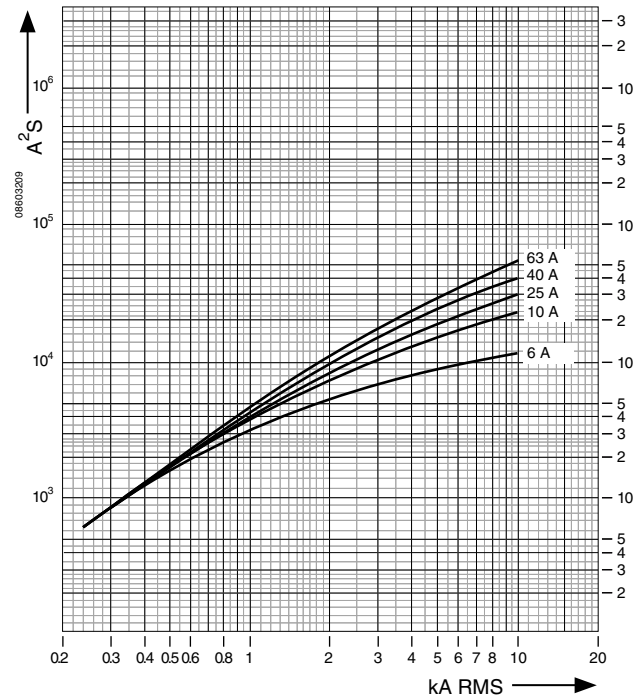


Figure 89: UL 1077 Recognized C60 2P, 3P, and 4P (480 Vac) Maximum Let-Through Peak Current

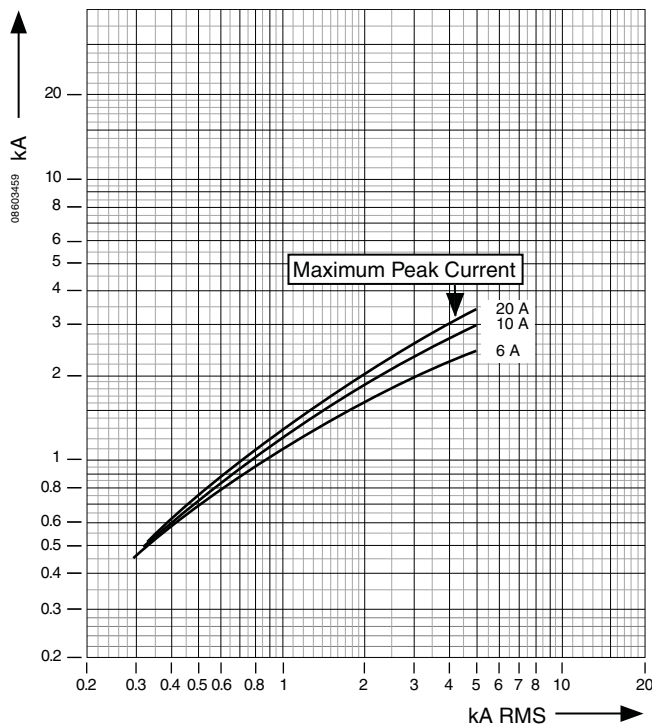
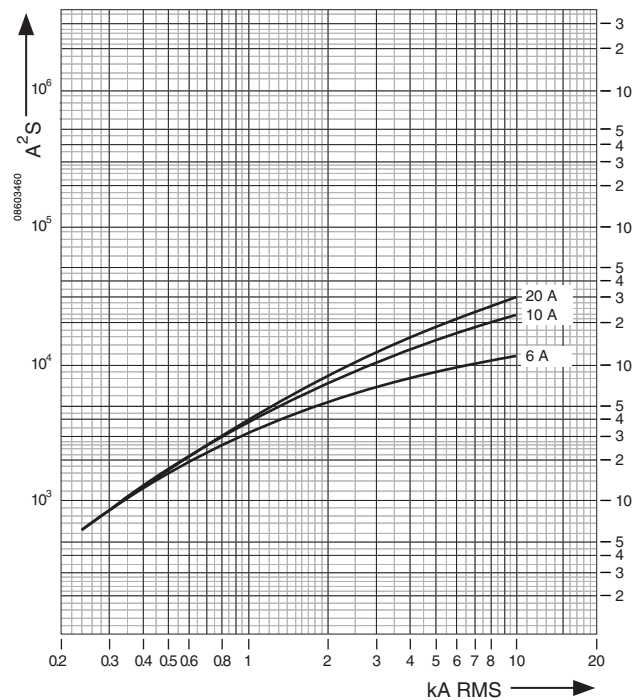


Figure 90: UL 1077 Recognized C60 2P, 3P, and 4P (480 Vac) Maximum Let-Through I²t Current



IEC 60947-2 Rated DPN-N Circuit Breakers

Figure 91: IEC Rated DPN-N (230/240 Vac) Maximum Let-Through Peak Current

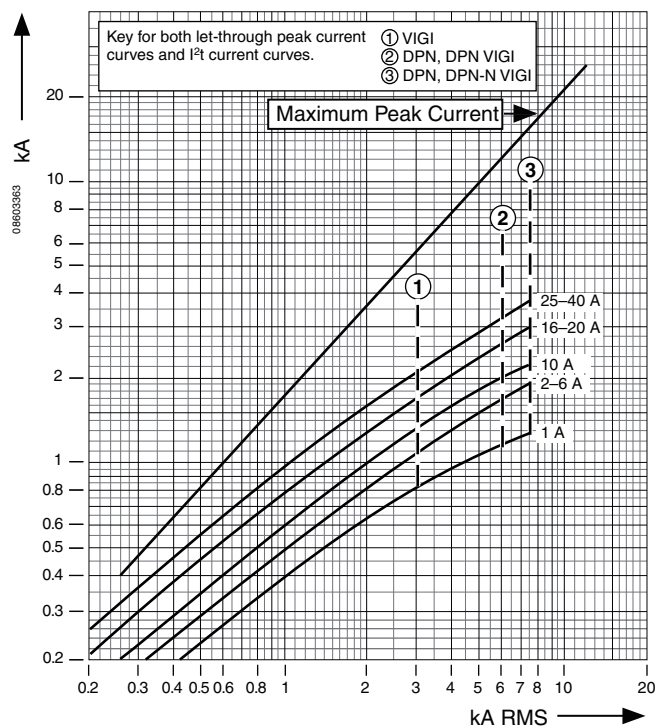
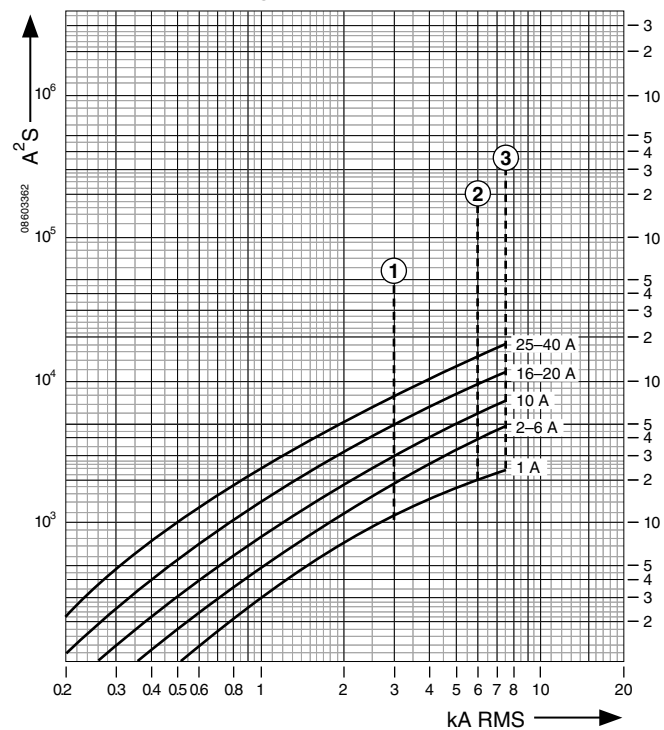


Figure 92: IEC Rated DPN-N (230/240 Vac) Maximum Let-Through I²t Current



IEC 60947-2 Rated C60N/H/L Circuit Breakers

Figure 93: IEC Rated C60 1P (277 Vac) Maximum Let-Through Peak Current

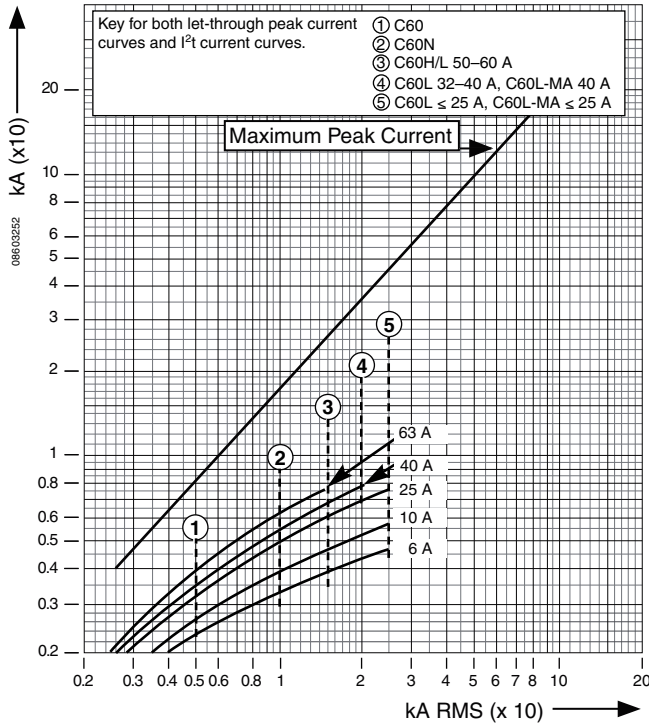


Figure 94: IEC Rated C60 1P (230/240 Vac) Maximum Let-Through I^2t Current

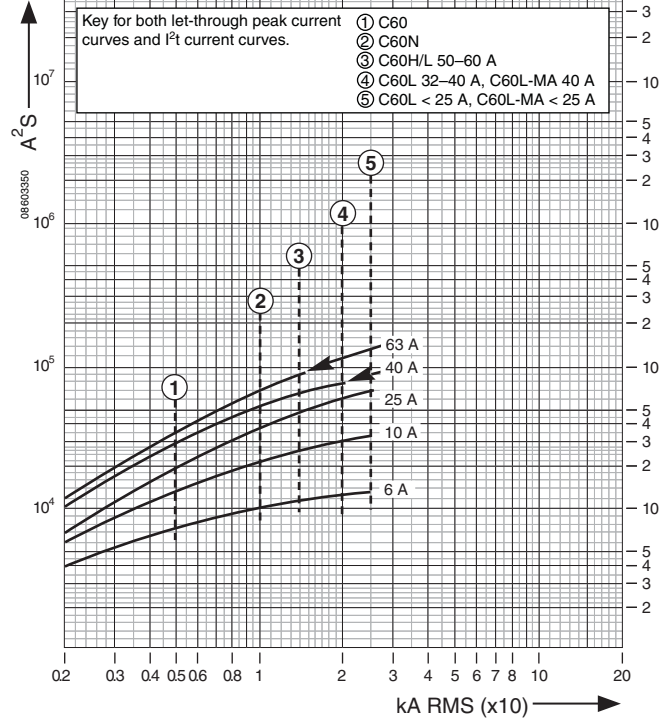


Figure 95: IEC Rated C60 2P, 3P and 4P (277 Vac) Maximum Let-Through Peak Current

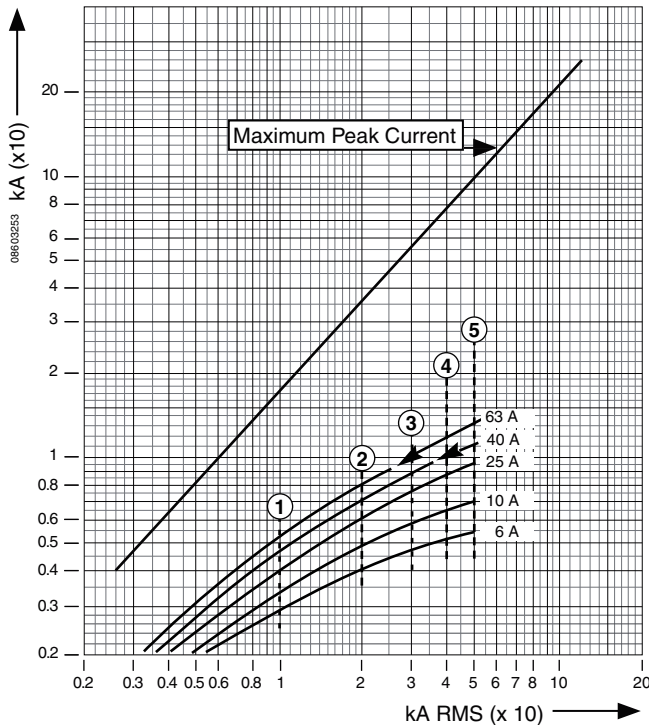
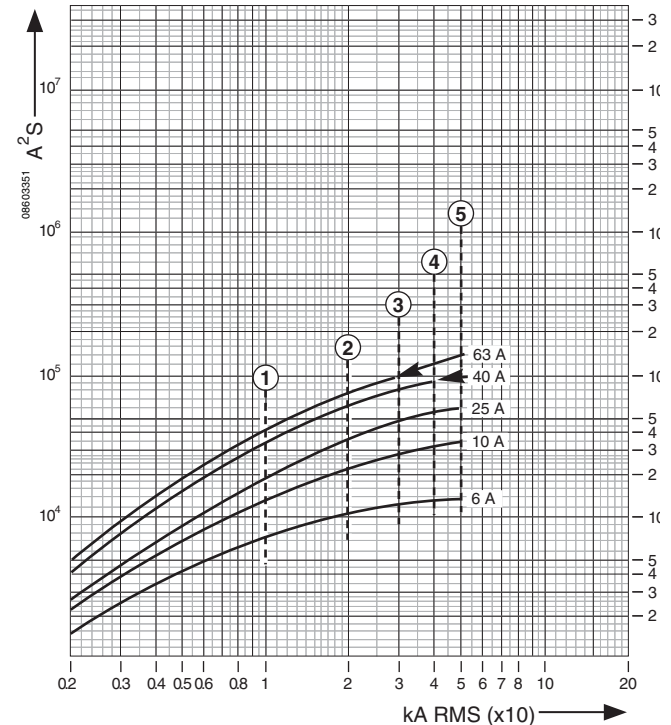


Figure 96: IEC Rated C60 2P, 3P and 4P (230/240 Vac) Maximum Let-Through I^2t Current



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Section 10—Let-Through Curves

Figure 97: IEC Rated C60 2P, 3P and 4P (400/415 Vac) Maximum Let-Through Peak Current

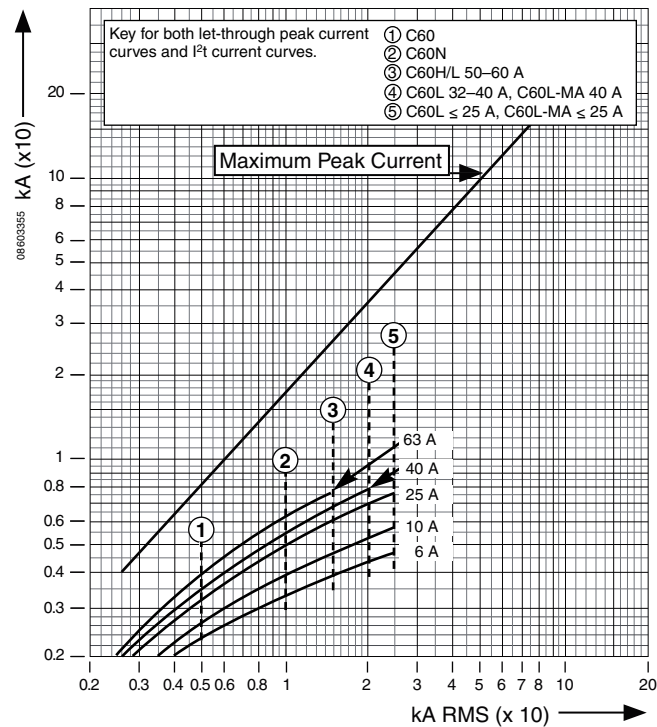
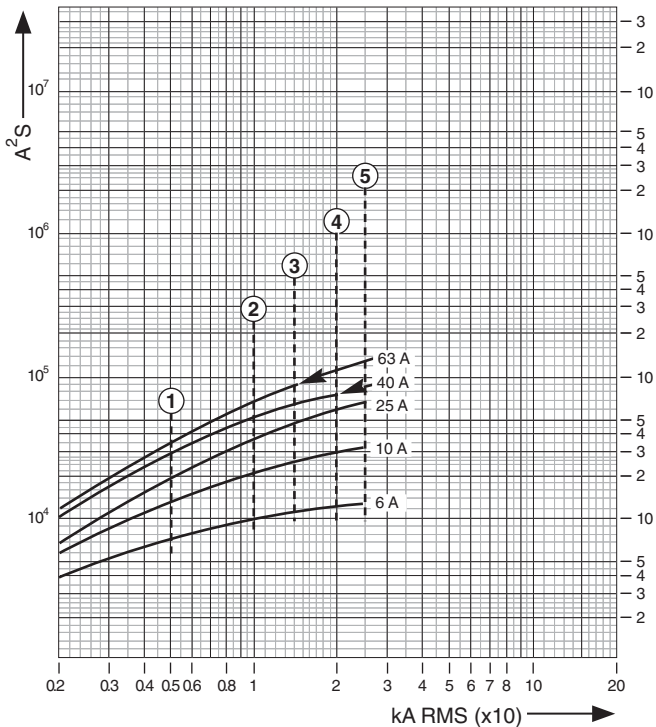


Figure 98: IEC Rated C60 2P, 3P and 4P (400/415 Vac) Maximum Let-Through I²t Current



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13968	67, 78	18031	64	18430	31	18492	31
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25401	29	25483	29	26648	38	60137	18	60201	18
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Schneider Electric USA, Inc.
3700 Sixth St. SW
Cedar Rapids, IA 52404 USA
1-888-SquareD
(1-888-778-2733)
www.us.SquareD.com

Schneider Electric Canada, Inc.
19 Waterman Avenue,
Toronto, Ontario M4B 1Y2
1-800-565-6699
www.schneider-electric.ca

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