ITEM OPPORTUNITY SYNOPSIS

Scouting Number:	2024-201
Name of the item to be scouted:	Circuit Breakers
State item to be used in:	Vermont
Describe the Item:	
Please describe the item application/the end use of the item.	Circuit breakers shall provide overcurrent protection to circuits
Supplier Information:	
Type of Supplier Being Sought (select from the list below):	
Manufacturer	x
Contract Manufacturer	
Distributor	
Other (Please Specify)	
Reason for Scouting Submission (select from the list below)	
2nd Supplier	
Price	
Re-Shore	
Past supplier no longer available	
New Product Startup	
BABA	x
Other (Please Specify)	
Summary of Technical Specifications and Performance Requirements:	
Describe the manufacturing processes (elaborate to provide as much detail as possible)	Breakers are molded and formed at the factory.
Provide dimensions / size / tolerances / performance specifications of the item	Circuit breakers shall be molded case, bolt on heavy-duty type having quick make, quick break manually operated toggle mechanism. Handle shall be trip free with three positions that clearly indicate when the breakers are "on," "off," or "tripped." Multiple pole circuit breakers shall operate on a common trip principle. All circuit breakers shall provide overcurrent and short circuit protection Circuit breakers shall be manufactured such that amperages shall be clearly visible on all breakers (stamped or labeled) without having to remove any components of the panelboard to obtain this information Special requirements shall be as indicated, including ground fault current interrupting (GFCI), shunt trip, arc fault, etc., on circuit breakers for indicated branch circuits on local distribution panels Provide 30mA GFCI circuit breakers for use on all heat trace circuits. Circuit breakers shown as service entrance protection on the Drawings shall be rated for such use
List required materials needed to make the product, including materials of product components, if applicable	Various, see attached data sheet
Are there applicable certification requirements?	
Yes	x
No	
Please explain:	UL
Are there any applicable regulations that apply to the production of this item?	
Yes	
No	x
Please explain:	
Are there any other standards / requirements?	
Yes	x
No	
Please explain:	Breakers shall conform to latest National Electrical Code.
NAICS CODES:	
NAICS 1	335313 Switchgear and switchboard apparatus manufacturing
NAICS 2	
Additional Comments:	
Additional technical comments:	

Volume and Pricing:	
Estimated Potential Business Volume (i.e. #units per day, month, year):	Circuit Breakers (known as of 7/16) – 56 · 20A-100A – price range from $150 - $600 based on type/configuration · 125A/3P - $2,000 (1) · 150A/3P - $800 (5) · 200A/3P - $1,000 (3) · 250A/3P - $2,100 (2) · 300A/3P - $2,300 (3) · 400A/3P - $2,500 (3) · 600A/3P - $4,500 (1) · 800A/3P - $6,000 (3) · 1600A/3P - $12,000 (1)
Estimated Target Price/Unit Cost Information:	Circuit Breakers (known as of 7/16) – 56 · 20A-100A – price range from $150 - $600 based on type/configuration · 125A/3P - $2,000 (1) · 150A/3P - $800 (5) · 200A/3P - $1,000 (3) · 250A/3P - $2,100 (2) · 300A/3P - $2,300 (3) · 400A/3P - $2,500 (3) · 600A/3P - $4,500 (1) · 800A/3P - $6,000 (3) · 1600A/3P - $12,000 (1)
Delivery Requirements:	
When is it needed by? (Immediate, 30 days, 6 months, etc.)	Construction is scheduled to start in February of 2025.
Describe packaging requirements (i.e. individually/group packaging, etc.)	Individually wrapped
Where will this item be shipped?	Norwich University, Northfield, VT
Additional Comments:	
Is there other information you would like to include?	Contact information for questions including BABA/Buy American compliance: Jones Architecture Alya Staber alya@jonesarch.com Please copy scouting@nist.gov on all correspondence.

SECTION 264400

SWITCHBOARDS AND PANELBOARDS

PART 1 – GENERAL

1.1 WORK INCLUDED

A. Provide indicated switchboards and panelboards.

B. Provide switchboard barriers between sections, and protective covers on all panelboard (incoming) terminals to isolate live connections.

1.2 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary General Conditions and other Division 01 specification sections, apply to this Section and to all Contractors, Subcontractors, or other persons supplying materials and/or labor, entering into the Project site and/or premises, directly, or indirectly.

B. The Specifications and Drawings are intended to be complementary. A particular section, paragraph or heading in a Division may not describe each and every detail concerning work to be done and materials to be furnished. The Drawings are diagrammatic and may not show all of the work required or all construction details. Dimensions are shown for critical areas only; all dimensions and actual placements are to be verified in the field. It is to be understood that the best trade practices of the Division will prevail. It remains the responsibility of the Contractor or Subcontractor to provide all items, equipment, construction, and services required to the proper execution and completion of the Work.

C. Reference listings are provided as a convenience to the Contractor or Subcontractor providing the Work of this Section and may not contain all the requirements affecting this Section. It remains the responsibility of the Contractor or Subcontractor to locate and comply with all requirements of the Contract Documents.

1.3 SUBMITTALS

A. Submit product data in accordance with Section 260100.

B. Submit as a minimum data including current, voltage and interrupting ratings and layout drawing including dimensions.

C. Submit time-current curves for all overcurrent protective devices with applicable settings indicated.

D. Submit complete surge protection specifications.

E. Submit test results in accordance with Section 260800.

F. Certifications: Provide manufacturer’s certification that all applicable products were manufactured in United States and meet the requirements of the Build America, Buy America Act (BABA) (part of Infrastructure Investment and Jobs Act).

1.4 QUALITY ASSURANCE

A. All specified items or systems shall be designed, manufactured, tested, and installed in compliance with applicable provisions of all governing codes, rules, laws, and ordinances in accordance with Section 260100.

1. If there is a conflict between applicable documents, then the more stringent requirement shall apply. All documents listed are believed to be the most current releases of the documents. The Contractor has the responsibility to determine and adhere to all applicable documents and to the most recent release when developing the proposal for installation.
2. This document does not replace any code, either partially or wholly. The Contractor must be aware of local codes that may impact this project.
3. The minimum AIC rating of equipment shall be as indicated on the Drawings. It shall be the responsibility of the equipment supplier to coordinate all secondary breaker interrupting capacities and to indicate them on applicable submittals. AIC ratings of equipment shall be based on a fully rated system.

B. Build America, Buy America Act (BABA) Requirements: All applicable products shall be manufactured in United States and shall meet the requirements of the Build America, Buy America Act (BABA) (part of Infrastructure Investment and Jobs Act).

PART 2 – PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with requirements, provide products by the following:

1. Switchboards and circuit breaker panelboards:

a. Siemens
b. General Electric
c. Square D
d. Cutler-Hammer

A. Substitutions: Items of equal quality, function and performance may be proposed for substituting by following the procedures outlined in Section 260100.

2.2 SWITCHBOARD

A. Provide dead front, NEMA 1, front accessible, rear aligned, self-supporting, group mounted distribution switchboard constructed of heavy-gauge steel. Unit shall be braced for symmetrical amperes as indicated on the drawings. Adequate lifting means shall be provided.

B. Switchboard busbars shall be high conductivity copper with bolted connections between sections and shall have the capability for future extension to an additional section. Provide full capacity neutral. A ground bus shall be provided in each switchboard section.

C. Circuit breakers shall be manufactured such that amperages shall be clearly visible on all breakers (stamped or labeled) without having to remove any components of the switchboard to obtain this information.

D. Main Section:

1. The main switchboard section shall have provisions for feeder conductor terminations and contain current and voltage meters and the service entrance circuit breaker.
2. The main section shall be bottom or top fed as needed, capable of terminating the indicated feeder cables. Cable connectors shall be mechanical compression style and suitable for the intended purpose.
3. Voltage and current meters shall have phase selector switches.
4. Main overcurrent device shall be a draw out molded case [power] circuit breaker rated as indicated on the Drawings, suitable for service entrance applications with electronic tripping means and AIC rating as indicated on the drawings. Breaker shall have adjustable long and short time trip settings.
5. The main service circuit breaker shall be equipped with a protective trip unit system to protect against overloads, short circuits and ground faults. The protective trip unit shall consist of a solid-state, microprocessor-based programmer, tripping means, current sensors, power supply and other devices required for proper operation. Trip unit shall be equipped with adjustable long-time, short-time, instantaneous and ground fault.
6. All circuit breakers rated 1200 amps or larger shall include an Arc Flash Reduction Maintenance System as required by NEC 240.87. The Arc Flash Reduction Maintenance System Technology shall be provided in a system that shall reduce the trip unit Instantaneous pickup value when activated. The Arc Flash Reduction Maintenance System shall not compromise breaker phase protection even when enabled. Once the unit is disabled, the recalibration of trip unit phase protection shall not be required. Activation and deactivation of the Arc Flash Reduction Maintenance trip setting shall be accomplished without opening the circuit breaker door and exposing operators to energized parts. The device shall provide a clearing time of 0.04 seconds, adjustable with a minimum of five settings ranging from 2.5X to 10X of the sensor value. The Arc Flash Reduction Maintenance System shall be provided with a switchgear panel mounted enable padlockable selector switch and indication via pilot light. The selector switch and pilot light shall be clearly identified to describe its use and function using laminated phenolic nameplates.
7. Service entrance switchboards shall be provided with voltage surge protection rated and suitable for the service.
8. The main section cabinet shall be provided with barriers placed such that no uninsulated, ungrounded service busbar or service terminal is exposed to inadvertent contact by persons or maintenance equipment while servicing the distribution section cabinet.

E. Surge Suppression:

1. Suppressors shall be listed in accordance with UL 1449 and UL 1283.
2. Suppressors shall provide redundant suppression modules between each phase conductor and the neutral conductor, between each phase conductor and the ground and between the neutral conductor and ground.
3. Suppressor manufacturer shall provide certified test data confirming a "fail-short" failure mode.
4. Visible indication of proper suppressor connection and operation shall be provided. The indicator lights shall indicate which phase as well as which module is fully operable.
5. The suppressor shall incorporate copper bus bars for the surge current path. Surge current diversion modules shall use bolted connections to the bus bars for reliable low impedance connections.
6. Suppressors shall meet or exceed the following criteria:

    a. Maximum single impulse current rating shall be no less than 240kA per phase.

b. Pulse life test: Capable of protecting against and surviving 5000 ANSI/IEEE C62.41 Category C transients without failure or degradation of UL 1449 clamp voltage by more than 10%.
c. UL 1449 clamping voltage must not exceed the following:

Voltage	L-N	L-G	N-G	L-L
208/120	330V	330V	330V	700V

d. The ANSI/IEEE C62.41-1991 Category C3 clamping voltage shall not exceed the following:

Voltage	L-N	L-G	N-G
208/120	520V	520V	520V

7. The SPD shall be constructed using surge current modules (MOV based). Each module shall be fused with user-replaceable 200,000 AIC rated fuses. The status of each module shall be monitored on the front of the SPD enclosure as well as on the module.
8. The SPD shall be installed internal to electrical distribution equipment by the electrical distribution equipment manufacturer.
9. The SPD shall be equipped with an audible alarm which shall actuate when any one of the surge current modules has failed. An alarm on/off switch shall be provided to silence the alarm and an alarm push-to-test switch shall be provided to test the alarm. Both switches and audible alarm shall be located on the front panel of the switchboard.
10. The suppressor shall have a response time no greater than 0.5 nanoseconds for any of the individual protection modes.
11. The suppressor will have a warranty for a period of five years, incorporating unlimited replacements of suppressor parts if they are destroyed by transients during the warranty period.
12. The suppressor shall include an internal UL listed disconnect switch.

F. Distribution Section:

1. The switchboard distribution section shall contain distribution circuit breakers as indicated on the Drawings.
2. The vertical main bus shall be full length furnished with provisions for future branch devices so that the entire available vertical space may be utilized.
3. The distribution section shall have provisions for a future additional distribution section. This includes appropriate space and bolt holes on the horizontal main bus and side panels.
4. Provide a minimum of two (2) 400A and (2) 250A full-size three-pole spaces for future equipment and additional spaces as indicated on the Drawings.

a. All feeders breakers shall be Electronic Trip Circuit Breakers:
b. Basis of Design: "PowerPact H-, J-, L-, P- and R-Frame" (200 amperes to 3000 amperes) as manufactured by Square D by Schneider Electric.
c. Current trip ratings shall be as indicated on the Drawings.
d. Circuit breaker trip system shall be a MICROLOGIC electronic trip unit with true RMS sensing.
e. Current transformers shall be used to ensure accurate measurements from low current up to high currents.
f. Electronic trip unit shall be fitted with thermal imaging.
g. The following monitoring functions shall be integral parts of electronic trip units:

1) A test connector shall be installed for checks on electronic and tripping mechanism operation using an external device.

2) LED for load indication at 105 percent.
3) LED for load indication at 90 percent of load for applications 600A and smaller.
4) LED for visual verification of protection circuit functionality for applications 600A or smaller.
5) Optional: LED for trip indication for applications above 600A.

h. MICROLOGIC trip unit functions shall consist of adjustable protection settings with the capability to be set and read locally by rotating a switch.

1) Long-time pick-up shall allow for adjustment to nine (9) long-time pick-up settings. This adjustment must be at least from 0.4 to 1 times the sensor plug (In), with finer adjustments available for more precise settings to match the application.
2) Adjustable long-time delay shall be in nine (9) bands. At six times Ir, from 0.5 to 24 seconds above 600A, and 0.5 to 16 seconds for 600A and below.
3) Short-time pick-up shall allow for nine (9) settings from 1.5 to 10 times Ir.
4) Short-time delay shall be in nine (9) bands from 0.1–0.4 I 2 t ON and 0–0.4 I 2 t OFF.
5) Instantaneous settings on the trip units with LSI protection shall be available in nine (9) bands.
6) Above 600A, from 2 to 15 times In

a) 600A, from 1.5 to 11 times In
b) 400A from 1.5 to 12 times In
c) 250A and below, from 1.5 to 15 times In

i. It shall be possible to fit the trip unit with a seal to prevent unauthorized access to the settings in accordance with NEC Section 240-6(b).
j. Trip unit shall provide local trip indication and capability to locally and remotely indicate reason for trip, i.e., overload, short circuit, or ground fault.

G. Ground Fault Protection:

1. Switchboard main shall have integral zero sequence ground fault protection with adjustable pickup current and time delay. The ground fault relay shall initiate an instantaneous trip when a fault occurs downstream of it and will block all upstream devices from tripping for a preset adjustable delay time. This will allow the downstream breaker to clear the fault and provide system coordination.

H. Phase Failure Relay:

1. Provide protection against phase failure of three-phase supply by opening main electronic trip circuit breaker. Provide three-phase sensing relay, control power transformer and control fuses.

I. Metering:

1. Provide Microprocessor-based, door-mounted monitoring and protective device designed to perform compete electrical metering and system voltage protection.
2. Direct reading metered values shall include:

a. AC ampere - Phase 1, Phase B, Phase C

b. AC Voltage - Phase A-N, Phase B-N, Phase C-N - Phase A-B, Phase B-C, Phase C-A, and N-G
c. Watts
d. Vars
e. VA
f. Power Factor
g. Frequency
h. Watt demand
i. Watthours
j. Frequency
k. % THD
l. Distortion factory
m. K-factor
n. User configurable custom screens
o. Voltage phase imbalance
p. Current phase imbalance

3. Unit shall be wired to the building automation system (BAS). Coordinate requirements with the BAS contractor. Unit shall be capable of being connected to an energy management system.
4. Unit shall operate with self-contained potential transformers and five (5) current transformers (provide neutral and ground current transformers).
5. Unit shall have harmonic analysis screens, cable to capture a high-speed wave form of two (2) cycles.
6. Web based.

J. All steel surfaces are to be chemically cleaned and treated, providing a bond between paint and metal surfaces to help prevent the entrance of moisture and the formation of rust under the paint. Finish coat shall be manufacturer's standard color.

K. If more distribution sections are needed than what is indicated on the Drawings to provide space needed for the required overcurrent protection devices, such sections shall be provided at no additional cost to the Owner and the Engineer shall be contacted for approval.

2.3 PANELBOARDS

A. Panelboards shall be of a dead front safety type, equipped with thermal magnetic bolt-on molded case circuit breakers or Type CCPB-compact circuit protector as indicated on the Drawings. All panels shall be of the same manufacture.

B. Panelboards on the drawings shall be provided with barriers, and/or protective covers, placed such that no uninsulated, ungrounded service busbar or service terminal is exposed to inadvertent contact by persons or maintenance equipment while servicing load terminations.

C. Gutter space shall be a minimum of 4" on all sides.

D. Panelboards shall have full capacity neutral bus and ground bus.

E. All buses including neutral and ground buses shall be of high conductivity copper.

F. Service entrance panelboards shall be provided with voltage surge protection rated and suitable for the service.

G. Provide isolated/insulated ground bus where indicated on the Drawings.

H. Provide surge suppression where indicated on the Drawings.

I. Provide double neutral bus where indicated on the Drawings.

J. Panelboard Enclosures:

1. Enclosures shall be fabricated from 16-gauge minimum galvanized or equivalent rust-resistant steel with rust-inhibiting primer and baked-enamel finish.
2. Panels shall be furnished with standard doors and locks. Key all locks alike and furnish two sets of keys.
3. Enclosure for panels rated 100 amperes and over shall have a hinged front cover so as to be a "door-on-door" arrangement.

K. Circuit Breakers:

1. Circuit breakers shall be molded case, bolt on heavy-duty type having quick make, quick break manually operated toggle mechanism. Handle shall be trip free with three positions that clearly indicate when the breakers are "on," "off," or "tripped." Multiple pole circuit breakers shall operate on a common trip principle. All circuit breakers shall provide overcurrent and short circuit protection.
2. Circuit breakers shall be manufactured such that amperages shall be clearly visible on all breakers (stamped or labeled) without having to remove any components of the panelboard to obtain this information.
3. Where new circuit breakers are to be added to existing panelboards, they shall be compatible with the panelboard. Where new circuit breakers are not part of an existing or new panelboard, they shall be housed in a NEMA 1 enclosure for dry locations and NEMA 3R for damp or exterior locations.
4. Where sprinklers are provided in the elevator shaft, provide shunt trip unit on circuit breaker for elevator power.
5. Special requirements shall be as indicated, including ground fault current interrupting (GFCI), shunt trip, arc fault, etc., on circuit breakers for indicated branch circuits on local distribution panels.
6. Provide 30mA GFCI circuit breakers for use on all heat trace circuits.
7. Circuit breakers shown as service entrance protection on the Drawings shall be rated for such use.
8. Circuit breaker(s) for the fire alarm system shall be mechanically protected, have a red marking (be accessible to only authorized personnel), and be identified as "FIRE ALARM CIRCUIT", as required by NFPA 72.

L. Surge Suppression:

1. Suppressors shall be listed in accordance with UL 1449 and UL 1283.
2. Suppressors shall provide redundant suppression modules between each phase conductor and the neutral conductor, between each phase conductor and the ground and between the neutral conductor and ground.
3. Suppressor manufacturer shall provide certified test data confirming a "fail-short" failure mode.
4. Visible indication of proper suppressor connection and operation shall be provided. The indicator lights shall indicate which phase as well as which module is fully operable.
5. The suppressor shall incorporate copper bus bars for the surge current path. Surge current diversion modules shall use bolted connections to the bus bars for reliable low impedance connections.
6. Suppressors shall meet or exceed the following criteria:

a. Maximum single impulse current rating shall be no less than 240kA per phase.
b. Pulse life test: Capable of protecting against and surviving 5000 ANSI/IEEE C62.41 Category C transients without failure or degradation of UL 1449 clamp voltage by more than 10%.
c. UL 1449 clamping voltage must not exceed the following:

Voltage	L-N	L-G	N-G	L-L
208/120	330V	330V	330V	700V

d. The ANSI/IEEE C62.41-1991 Category C3 clamping voltage shall not exceed the following:

Voltage	L-N	L-G	N-G
208/120	520V	520V	520V

7. The SPD shall be constructed using surge current modules (MOV based). Each module shall be fused with user-replaceable 200,000 AIC rated fuses. The status of each module shall be monitored on the front of the SPD enclosure as well as on the module.
8. The SPD shall be installed internal to electrical distribution equipment by the electrical distribution equipment manufacturer.
9. The SPD shall be equipped with an audible alarm which shall actuate when any one of the surge current modules has failed. An alarm on/off switch shall be provided to silence the alarm and an alarm push-to-test switch shall be provided to test the alarm. Both switches and audible alarm shall be located on the front panel of the switchboard.
10. The suppressor shall have a response time no greater than 0.5 nanoseconds for any of the individual protection modes.
11. The suppressor will have a warranty for a period of five years, incorporating unlimited replacements of suppressor parts if they are destroyed by transients during the warranty period.
12. The suppressor shall include an internal UL listed disconnect switch.

PART 3 – EXECUTION

3.1 INSTALLATION

A. Switchboard and panelboard installation shall conform to NEC requirements, in particular Article 110-16.

B. Floor-mounted switchboards shall be mounted on 4-inch high concrete housekeeping pads.

C. Install switchboards and panelboards according to manufacturer's recommendations.

D. Test switchboards and panelboards in accordance with Section 260800.

E. Provide filler pieces for unused spaces in switchboards and panelboards.

F. Prepare and affix typewritten directory to inside cover of switchboard and panelboard doors indicating loads controlled by each circuit. Protect directory with plastic. Use of Engineer's panelboard schedule for panelboard directory is not allowed.

G. All panels shall be mounted in accordance with Section 260700.

H. Unless otherwise indicated on the Drawings, install all switchboards and panelboards with the top breaker handle 6'6" maximum above the finished floor, or concrete pad.

I. Verify exact wall dimensions in field to ensure that standard panelboard cabinets specified can be arranged in the space allocated.

J. All scratched or marred surfaces shall be repaired to match original condition.

K. All switchboards and panelboards shall have permanently affixed circuit numbers at each circuit space.

L. Provide two (2) spare 1" conduits from each new flush-mounted panelboard to accessible area above ceiling.

END OF SECTION

Section 7

Miniature and Molded Case Circuit Breakers

B-Frame

H-Frame

J-Frame

L-Frame

M-Frame

P-Frame

R-Frame

QO Miniature Circuit Breakers

QO™ Circuit Breakers




Circuit Breaker Type	Plug-on	QO			QO-H	QO-VH					QH		QOT	QO-AF	QO-VHAF	QO-AFGF	QOVH-AFGF
	Bolt-on	QOB			QOB-H	—	—	—	QOB-VH		QHB		—	QOB-CAFI	QOB-VHAF	QOB-DF	QOB-VHDF
	Unit Mount	—			—	—	—	—	—	—	—	—	—	—	—	—	—
Number of Poles		1	2	3	2	1	2	3	1	2, 3 [1]	1,2	3	1	1, 2	1, 2	1	1
Current Range (A)		10–70	10–200 [2]	10–100	15–100	15–70	15–125	15–100	15–70	15–150	15–30	15–30	15–30	15–20	15–20	15–20	15–20
Interrupting Ratings																	
UL/CSA Rating (kA) (50/60 Hz)	120 Vac	10	10	10	10	22	22	22	22	22	65	65	10	10	22	10	22
	120/240 Vac	10	10	10	10	22	22	22	22	22	65	65	10	10	22	—	—
	208Y/120	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	240 Vac [3]	—	—	10	10	—	—	22	—	22 [4]	—	65	—	—	—	—	—
	277 Vac	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	480Y/277 Vac	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
DC Ratings	48 Vdc	—	5 [5]	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	60 Vdc	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	65 Vdc	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	125 Vdc	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	250 Vdc	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	500 Vdc	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
IEC 60947-2 (50/60 Hz) [6]	IEC	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	(Icu)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Special Ratings																	
CCC		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Fed. Specs W-C-375B/GEN		X	—	—	—	X	—	—	—	—	X	—	X	X	—	X	X
Other Standard		HACR [7] NOM			HACR [7]						—	—	—	HACR [7]	—	HACR [7]	HACR [7]
Accessories and Modifications																	
Shunt Trip [8]		X	X	X	X	X	X	X	X	X [9]	X	X	X	—	—	—	—
Undervoltage Trip		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Auxiliary Switches [8]		X	X	X	X	X	X	X	X	X [9]	X	X	X	—	X	—	—
Alarm Switch [8]		X	X	X	X	X	X	X	X	X [9]	X	X	X	—	X	—	—
Handle Operators		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Handle Padlock Attachment		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Trip System Type																	
Thermal-magnetic		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Molded Case Switch		X	X	X	—	—	—	—	—	—	—	—	—	—	—	—	—
Dimensions (1P Unit Mount)																	
Dimensions (1P Unit Mount) in. (mm)	Height	3.5 (89) [1]												4.75 (121)			
	Width	0.75 (19) [1]															
	Depth	2.92 (74) [1]															
Pages		page 7-11															

QO-GFI, QO-EPD, QOU, QOM Miniature Circuit Breakers

		QO Circuit Breakers			QOU Circuit Breakers		QOM1 and QOM2 Main Circuit Breakers	
								
Circuit Breaker Type	Plug-on	QO-GFI	QO-VHGFI	QO-EPD QO-EPE	—	—	—	—

[1] For dimensions for QOB2150VH, QOB3110VH, QOB3125VH and QOB3150VH, see page 7-82
[2] 2P 150–200 A requires 4P width.
[3] See the Supplemental Digest, Section 3 for 3Ø corner grounded systems.
[4] 22 kA @ 240 Vac for 3P only.
[5] 2P, 10–60 A only, suffix 5272.
[6] See the Supplemental Digest Section 10 for circuit breakers with IEC ratings.
[7] HACR on QO, QOB 1P 10–70 A, 2P 15–100 A, 3P 10–100 A; QOB-VH 1P 15–70 A, 2P 15–125 A, 3P 15–100 A.
[8] Factory-installed option only.
[9] Factory-installed accessories are not available on QOB-VH 2P150 A and 3P 110–150 A.

		QO Circuit Breakers							QOU Circuit Breakers				QOM1 and QOM2 Main Circuit Breakers	
	Bolt-on	QOB-GFI			QOB-VHGFI	QOB-EPD QOB-EPE			—			—	QOM1-VH	QOM2-VH
	Unit Mount	—	—	—	—	—	—	—	QOU			QYU *[10]*	—	—
Number of Poles		1	2	3	1	1	2	3	1	2	3	1	2	2
Current Range (A)		15–30	15–60	15–50	15–30	15–30	15–60	15–50	10–100	10–125	10–100	10–30	50–125	100–225
Interrupting Ratings														
UL/CSA Rating (kA RMS) (50/60 Hz)	120 Vac	10	10	—	22	10	10	—	10	10	10	—	22	22
	120/240 Vac	—	10	—	—	—	10	—	10	10	10	—	22	22
	208Y/120	—	—	10	—	—	—	—						
	240 Vac *[11]*	—	—	—	—	—	—	10	—	—	10	—	—	—
	277 Vac	—	—	—	—	—	—	—	—	—	—	5	—	—
	480Y/277 Vac	—	—	—	—	—	—	—	—	—	—	—	—	—
DC Ratings	48 Vdc	—	—	—	—	—	—	—	—	—	—	—	—	—
	60 Vdc	—	—	—	—	—	—	—	5 *[12]*	5 *[12]*	5 *[12]*	—	—	—
	65 Vdc	—	—	—	—	—	—	—	—	—	—	—	—	—
	125 Vdc	—	—	—	—	—	—	—	—	—	—	—	—	—
	250 Vdc	—	—	—	—	—	—	—	—	—	—	—	—	—
	500 Vdc	—	—	—	—	—	—	—	—	—	—	—	—	—
IEC 60947-2 (50/60 Hz) Icu	240 Vac	—	—	—	—	—	—	—	—	—	—	—	—	—
	415 Vac	—	—	—	—	—	—	—	—	—	—	—	—	—
Special Ratings														
CCC		—	—	—	—	—	—	—	X *[13]*	X *[13]*	X *[13]*	—	—	—
Fed. Specs W-C-375B/GEN		X	—		—	X	—		X	X	X	X	X	X
Other Standard		NOM			—	NOM			HACR *[14]*			—	—	—
Accessories and Modifications														
Shunt Trip		—	—	—	—	—	—	—	X *[15]*	X *[15]*	X *[15]*	X *[15]*	—	X *[15]*
Undervoltage Trip		—	—	—	—	—	—	—	—	—	—	—	—	—
Auxiliary Switches		X	X	X	X	X	X	X	X *[15]*	X *[15]*	X *[15]*	X*[15]*	—	—
Alarm Switch		X	X	X	X	X	X	X	X *[15]*	X *[15]*	X *[15]*	X *[15]*	—	—
Handle Operators		—	—	—	—	—	—	—	—	—	—	—	—	—
Handle Padlock Attachment		X	X	X	X	X	X	X	X	X	X	X	X	X
Trip System Type														
Thermal-magnetic		X	X	X	X	X	X	X	X	X	X	X	X	X
Molded Case Switch		—	—	—	—	—	—	—	—	X	X	—	—	—
Dimensions (1P Unit Mount)														
Dimensions (1P Unit Mount) in. (mm)	Height	4.12 (103)							4.05 (103)				5.09 (129) *[16]*	5.60 (142) *[16]*
	Width	0.75 (19)							0.75 (19)				5.00 (127) *[16]*	5.07 (129) *[16]*
	Depth	2.92 (74)							2.92 (74)				3.47 (88) *[16]*	3.60 (91) *[16]*
Pages		page 7-11							page 7-19				See Section 1	

NOTE: All circuit breakers on this chart are UL Listed and CSA Certified unless otherwise noted.

[10] QYU is a UL 1077 supplementary protector.
[11] For information regarding 3Ø corner grounded systems see the Supplemental Digest, Section 3.
[12] QOU is UL Listed for 60 Vdc per pole 80–100 A, 1P; 80–125 A, 2P; and 70–100 A, 3P.
[13] 15–70 A 1P and 2P, 15–60 A 3P
[14] HACR on QOU 1P and 3P 15–100 A, 2P 15–125 A;
[15] Factory-installed option only.
[16] QOM1 and QOM2 dimensions are for 2-pole unit.

HOM Circuit Breakers

HOM Circuit Breakers



Circuit Breaker Type	Plug-on	HOM		HOM-CAFI	HOM-DF	HOM-GFI		HOM-EPD		HOMT
	Bolt-on	—	—	—	—	—	—	—	—	—
	Unit Mount	—	—	—	—	—	—	—	—	—
Number of Poles		1	2	1, 2	1	1	2	1	2	1
Current Range (A)		15–50	15–200 *[17]*	15–20	15–20	15–20	15–50	15–20	15–50	15–50 *[18]*
Interrupting Ratings										
UL/CSA Rating (kA) (50/60 Hz)	120 Vac	10	10	10	10	10	10	10	10	10
	120/240 Vac	10	10	10	—	—	10	—	10	10
	208Y/120	—	—	—	—	—	—	—	—	—
	240 Vac *[19]*	—	—	—	—	—	—	—	—	—
	277 Vac	—	—	—	—	—	—	—	—	—
	480Y/277 Vac	—	—	—	—	—	—	—	—	—
DC Ratings	48 Vdc	—	—	—	—	—	—	—	—	—
	60 Vdc	—	—	—	—	—	—	—	—	—
	65 Vdc	—	—	—	—	—	—	—	—	—
	125 Vdc	—	—	—	—	—	—	—	—	—
	250 Vdc	—	—	—	—	—	—	—	—	—
IEC 60947-2 (50/60 Hz) *[20]*	IEC (Icu)	—	—	—	—	—	—	—	—	—
		—	—	—	—	—	—	—	—	—
Special Ratings										
CCC		—	—	—	—	—	—	—	—	—
Fed. Specs W-C-375B/GEN		X	X	X	X	X	X	X	X	X
Other Standard		HACR *[21]* NOM		HACR *[21]*						
Accessories and Modifications										
Shunt Trip *[22]*		—	—	—	—	—	—	—	—	—
Undervoltage Trip		—	—	—	—	—	—	—	—	—
Auxiliary Switches *[22]*		—	—	—	—	—	—	—	—	—
Alarm Switch *[22]*		—	—	—	—	—	—	—	—	—
Handle Operators		—	—	—	—	—	—	—	—	—
Handle Padlock Attachment		X	X	X	X	—	—	—	—	X *[23]*
Trip System Type										
Thermal-magnetic		X	X	X	X	X	X	X	X	X
Molded Case Switch		—	—	—	—	—	—	—	—	—
Dimensions (1P Unit Mount)										
Dimensions (1P Unit Mount) in. (mm)	Height	3.13 (79)								
	Width	1.00 (25)								
	Depth	2.98 (76)								
Pages		page 7-22								

[17] 2P 150–200 A requires 4P width.
[18] HOMT tandem is 30 A maximum. HOMT quad tandem has 20 A maximum on outside poles, and 50 A maximum on the inside poles.
[19] See the Supplemental Digest, Section 3 for 3Ø corner grounded systems.
[20] See the Supplemental Digest Section 10 for circuit breakers with IEC ratings.
[21] HACR on HOM 1P 15–50 A and 2P 15–100 A.
[22] Factory-installed option only.
[23] Handle padlock attachment available for HOMT quad tandem only.

Multi 9, EDB Miniature Circuit Breakers

		Multi 9™ Circuit Breakers and Supplementary Protectors								EDB Circuit Breakers					
															
Circuit Breaker Type	Plug-on	—			—					—		—		—	
	Bolt-on	—			—					EDB		EGB		EJB	
	Unit Mount	UL 489 $C60_{BP}$			UL1077 $C60_{SP}$ *[24]*			C60H-DC		—		—		—	
Number of Poles		1	2	3	1	2	3,4	1	2	1	2, 3	1	2, 3	1	2, 3
Current Range (A)		0.5–63	0.5–63	0.5–63	0.5–63	1–63	1–63	0.5–63	0.5–63	15–70	15–125	15–70	15–125	15–70	15–125
Interrupting Ratings															
UL/CSA Rating (kA RMS) (50/60 Hz)	120 Vac	14 *[25]*	14 *[25]*	14 *[25]*	14 *[26]*	14 *[26]*	14 *[26]*	—	—	25	25	65	65	100	100
	120/240 Vac	14 *[25]*	14 *[25]*	14 *[25]*	14 *[26]*	14 *[26]*	14 *[26]*	—	—	18	25	35	65	65	100
	240 Vac *[27]*	14 *[25]*	14 *[25]*	14 *[25]*	14 *[26]*	14 *[26]*	14 *[26]*	—	—	18	25	35	65	65	100
	277 Vac	—	—	—	10 *[28]*	10 *[28]*	10 *[28]*	—	—	18	18	35	35	65	65
	480Y/277 Vac	10 *[29]*	10 *[30]*	10 *[30]*	—	10 *[28]*	10 *[28]*	—	—	—	18	—	35	—	65
DC Ratings	48 Vdc	—	—	—	—	10	—	5	5	—	—	—	—	—	—
	60 Vdc	10	10	—	20	—	—	5	5	—	—	—	—	—	—
	65 Vdc	—	—	—	—	—	—	5	5	—	—	—	—	—	—
	125 Vdc	—	10	—	—	—	—	5	5	—	—	—	—	—	—
	250 Vdc	—	—	—	—	—	—	5	5	—	—	—	—	—	—
	500 Vdc	—	—	—	—	—	—	—	5 *[31]*	—	—	—	—	—	—
IEC 60947-2 (50/60 Hz) Icu	240 Vac	10	20	20	10	20	20	—	—	20	—	—	—	—	—
	415 Vac	—	10	10	—	5	5	—	—	10	—	—	—	—	—
Special Ratings															
CCC		X	X	X	X	X	X	X	X	—	—	—	—	—	—
Other Standard		IEC								HACR					
Accessories and Modifications															
Shunt Trip		X	X	X	X	X	X	X	X	X *[32]*	X *[32]*	X *[32]*	X *[32]*	X *[32]*	X *[32]*
Undervoltage Trip		X	X	X	X	X	X	X	X	—	—	—	—	—	—
Auxiliary Switches		X	X	X	X	X	X	X	X	X *[32]*	X *[32]*	X *[32]*	X *[32]*	X *[32]*	X *[32]*
Alarm Switch		X	X	X	X	X	X	X	X	X *[32]*	X *[32]*	X *[32]*	X *[32]*	X *[32]*	X *[32]*
Handle Operators		X	X	X	X	X	X	X	X	—	—	—	—	—	—
Handle Padlock Attachment		X	X	X	X	X	X	X	X	X	X	X	X	X	X
Trip System Type															
Thermal-magnetic		X	X	X	X	X	X	X	X	X	X	X	X	X	X
Molded Case Switch		—	—	—	—	—	—	—	—	—	—	—	—	—	—
Dimensions (1P Unit Mount)															
Dimensions (1P Unit Mount) in. (mm)	Height	4.05 (103)			3.19 (81)			3.19 (81)		5.66 (144)					
	Width	0.71 (18)			0.71 (18)			0.71 (18)	1.42 (36)	0.98 (25)					
	Depth	2.76 (70)			2.76 (70)			2.56 (65)		4.05 (103)					
Pages		page 7-25								See Section 9					

NOTE: All circuit breakers on this chart are UL Listed and CSA Certified unless otherwise noted.

[24] C60 are recognized components per UL 1077.
[25] 14 kA up to 35 A, 10 kA from 40 to 63 A.
[26] 14 kA up to 32 A, 10 kA from 40 to 63 A.
[27] For information regarding 3Ø corner grounded systems see the Supplemental Digest, Section 3.
[28] 10 kA up to 32 A, 5 kA from 40 to 63 A.
[29] Up to 35 A.
[30] 10 kA up to 35 A.
[31] 2 poles must be wired in series for 500 Vdc.
[32] Factory-installed option only.

B-, H-, J-Frame Molded Case Circuit Breakers

		PowerPacT™ 125 A B-Frame				PowerPacT 150 A H-Frame Electronic Trip Version					PowerPacT 250 A J-Frame Electronic Trip Version				
															
Circuit Breaker Type		BD	BG	BJ	BK	HD	HG	HJ	HL	HR	JD	JG	JJ	JL	JR
Number of Poles		1, 2, 3, 4	1, 2, 3, 4	1, 2, 3, 4	1, 2	2, 3	2, 3	2, 3 *[33]*	2, 3 *[33]*	3	2, 3 *[33]*	2, 3 *[33]*	2, 3 *[33]*	2, 3 *[33]*	3
Current Range (A)		15–125	15–125	15–125	15–30	15–150	15–150	15–150	15–150	15–150	70–250 *[34]*	70–250 *[34]*	70–250 *[34]*	70–250 *[34]*	70–250 *[34]*
Interrupting Ratings															
UL/CSA/ NOM AC Rating (kA RMS) (50/60 Hz)	240 Vac	25	65	100	100	25	65	100	125	200	25	65	100	125	200
	480Y/277 Vac	18	35	65	65	18	35	65	100	200	18	35	65	100	200
	480 Vac	18	35	65	65	18	35	65	100	200	18	35	65	100	200
	600Y/347 Vac	14	18	25	65	14	18	25	50	100	14	18	25	50	100
	600 Vac	—	—	—	—	14	18	25	50	100	14	18	25	50	100
UL/CSA/ NOM DC Ratings	250 Vdc *[35]* *[36]*	10	20	50	—	20	20	20	20	—	20	20	20	20	—
	500 Vdc *[35]*	—	—	—	—	—	20	—	50	—	—	20	—	50	—
IEC AC Rating (kA RMS) (50/60 Hz) Icu/Ics *[37]*	220/240 Vac	25	65	100	100	25	65	100	125	150	25	65	100	125	150
	380/415 Vac	18	35	65	65	18	35	65	100	125	18	35	65	100	125
	440/480 Vac	18	35	65	65	18	35	65	100	125	18	18	25	50	125
	500/525 Vac	14	18	25	25	14	18	25	50	75	14	20	20	20	75
	690 Vac	—	—	—	—	—	—	—	—	20	—	—	—	—	20
IEC DC Ratings	250 Vdc	—	—	—	—	—	—	—	—	—	20	20	20	20	—
	500 Vdc	—	—	—	—	—	—	—	—	—	20	20	20	20	—
Special Ratings															
CCC		X	X	X	X	X	X	X	X	X	X	X	X	X	X
Fed. Specs W-C-375B/GEN		X	X	X	X	X	X	X	X	X	X	X	X	X	X
HACR		X	X	X	X	X	X	X	X	X	X	X	X	X	X
Connections/Terminations															
Unit Mount		X	X	X	X	X	X	X	X	X	X	X	X	X	X
I-Line™		X	X	X	X	X	X	X	X	X	X	X	X	X	X
Rear Connection		—	—	—	—	X *[38]*	X *[38]*	X	X	X	X	X	X	X	X
Drawout		—	—	—	—	X *[38]*	X *[38]*	X	X	X	X	X	X	X	X
Optional Lugs		X	X	X	X	X *[38]*	X *[38]*	X	X	X	X	X	X	X	X
Accessories and Modifications															
Shunt Trip		X	X	X	X	X	X	X	X	X	X	X	X	X	X
Undervoltage Trip		X	X	X	X	X	X	X	X	X	X	X	X	X	X
Auxiliary Switches		X	X	X	X	X	X	X	X	X	X	X	X	X	X
Alarm Switch		X	X	X	X	X	X	X	X	X	X	X	X	X	X
Motor Operator		—	—	—	—	X *[38]*	X *[38]*	X	X	X	X	X	X	X	X
Handle Operators		X	X	X	X	X *[38]*	X *[38]*	X	X	X	X	X	X	X	X
Mechanical Interlocks (3P)		X	X	X	—	X	X	X	X	X	X	X	X	X	X
Handle Padlock Attachment		X	X	X	X	X *[38]*	X *[38]*	X	X	X	X	X	X	X	X
Cylinder Lock (3P)		—	—	—	—	—	—	—	—	—	—	—	—	—	—
Optional GF Protection		—	—	—	—	X	X	X	X	X	X	X	X	X	X
Trip System Type															
Thermal-magnetic		X	X	X	X	X	X	X	X	—	X	X	X	X	X
Instantaneous-only (MCP)		—	—	—	—	—	X	X *[39]*	X *[39]*	X *[39]*	—	X *[39]*	X *[39]*	X	X
Molded Case Switch (Automatic)		X	X	X	X	—	X	—	X	—	—	X	—	X	X
Electronic		—	—	—	—	X *[39]*	X *[39]*	X *[39]*	X *[39]*	X *[39]*	X *[39]*	X *[39]*	X *[39]*	X *[39]*	X *[39]*
Enclosures (page 7-82–page 7-84)															
General Purpose (NEMA 1)		—	—	—	—	X	X	X	X	—	X	X	X	X	—
Raintight (NEMA 3R)		—	—	—	—	X	X	X	X	—	X	X	X	X	—
Dust-tight (NEMA 12)		—	—	—	—	X	X	X	X	—	X	X	X	X	—
Watertight (NEMA 4, 4X, 5)		—	—	—	—	X	X	X	X	—	X	X	X	X	—
Explosion Proof (NEMA 7, 9)		—	—	—	—	—	—	—	—	—	X *[40]*	X *[40]*	—	—	—
Dimensions (3P Unit Mount) in. (mm)	Height	5.4 (137)				6.4 (163)					7.5 (191)				
	Width	3.2 (81)				4.1 (104)					4.1 (104)				
	Depth	3.5 (89)				3.4 (86)					3.4 (86)				
Pages (Unit Mount) / (I-Line)		page 7-32 / Section 9				page 7-33 / Section 9					page 7-33 / Section 9				

NOTE: All circuit breakers on this chart are UL Listed and CSA Certified unless otherwise noted.

[33] 2P in a 3P module.
[34] 70–250 A with electronic trip system
[35] Not available with electronic trip units
[36] 1P Available at 125 Vdc
[37] Dual UL and IEC ratings and CE markings on circuit breakers. For additional IEC ratings, see the Supplemental Digest, Section 10.
[38] Not available in HD and HG 2P rating (2P module).
[39] 3P only.
[40] Not UL Listed due to wire bending space.

PowerPacT™ Q-Frame, Q4, LA, LH, L-Frame Molded Case Circuit Breakers

		PowerPacT 250 A Q-Frame				Q4	400 A LA/LH		PowerPacT 600 A L-Frame			
												
Circuit Breaker Type		QB	QD	QG	QJ	Q4	LA	LH	LG	LJ	LL	LR
Number of Poles		2, 3	2, 3	2, 3	2, 3	2, 3	2, 3	2, 3	3, 4	3, 4	3, 4	3, 4
Current Range (A)		70–250 *[41]*	70–250 *[41]*	70–250 *[41]*	70–250 *[41]*	250–400	125–400	125–400	70–600	70–600	70–600	70–600
Interrupting Ratings												
UL/CSA/NOM AC Rating (kA RMS) (50/60 Hz)	240 Vac	10	25	65	100	25	42	65	65	100	125	200
	480Y/277 Vac	—	—	—	—	—	30	35	35	65	100	200
	480 Vac	—	—	—	—	—	30	35	35	65	100	200
	600Y/347 Vac	—	—	—	—	—	22	25	18	25	50	100
	600 Vac	—	—	—	—	—	22	25	18	25	50	100
UL/CSA/NOM DC Ratings	250 Vdc *[42]*	—	—	—	—	—	10	50	—	—	—	—
	500 Vdc *[43][42]*	—	—	—	—	—	—	20	20	—	50	—
IEC AC Rating (kA RMS) (50/60 Hz) Icu/Ics *[44]*	220/240 Vac	10/5	10/5	10/5	10/5	—	—	—	65	100	125	150
	380/415 Vac	10/5	10/5	10/5	10/5	—	20/5*[45]*	20/5*[45]*	18	65	100	125
	440/480 Vac	—	—	—	—	—	—	—	18	65	100	125
	500/525 Vac	—	—	—	—	—	—	—	14	25	50	75
	690 Vac	—	—	—	—	—	—	—	—	—	—	20
IEC DC Ratings	250 Vdc	—	—	—	—	—	—	—	—	—	—	—
	500 Vdc	—	—	—	—	—	—	—	—	—	—	—
Special Ratings												
CCC		—	—	—	—	—	—	—	X	X	X	X
Fed. Specs W-C-375B/GEN		X	X	X	X	X	X	X	X	X	X	X
HACR (2P, 3P)		X	X	X	—	—	X	X	X	X	X	X
Connections/Terminations												
Unit Mount		X	X	X	X	X	X	X	X	X	X	X
I-Line™		X	X	X	X	X	X	X	X	X	X	X
Rear Connection		—	—	—	—	X	X	X	X	X	X	X
Drawout		—	—	—	—	—	—	—	X	X	X	X
Optional Lugs		—	—	—	—	X	X	X	X	X	X	X
Accessories and Modifications												
Shunt Trip		—	—	—	—	X	X	X	X	X	X	X
Undervoltage Trip		—	—	—	—	X	X	X	X	X	X	X
Auxiliary Switches		—	—	—	—	X	X	X	X	X	X	X
Alarm Switch		—	—	—	—	X	X	X	X	X	X	X
Motor Operator		—	—	—	—	X	X	X	X	X	X	X
Handle Operators		—	—	—	—	X	X	X	X	X	X	X
Mechanical Interlocks (3P)		X	X	X	X	—	X *[46]*	X *[46]*	X	X	X	X
Handle Padlock Attachment		X	X	X	X	X	X	X	X	X	X	X
Cylinder Lock (3P*[47]*)		—	—	—	—	X	X	X	—	—	—	—
Optional GF Protection*[48]*		—	—	—	—	—	—	—	X	X	X	X
Trip System Type												
Thermal-magnetic		X	X	X	X	X	X	X	—	—	—	—
Instantaneous-only (MCP)		—	—	—	—	—	X	X	X	X	X	X
Molded Case Switch (Automatic)		X	—	—	—	—	—	X	X	—	X	X
Electronic		—	—	—	—	—	—	—	X	X	X	X
Enclosures (page 7-82–page 7-84)												
General Purpose (NEMA 1)		X	X	X	X	X	X	X	—	—	—	—
Raintight (NEMA 3R)		X	X	X	X	X	X	X	—	—	—	—
Dust-tight (NEMA 12)		—	—	—	—	X	X	X	X *[49]*	X *[49]*	X *[49]*	X *[49]*
Watertight (NEMA 4, 4X, 5)		—	—	—	—	X	X	X	—	—	—	—
Explosion Proof (NEMA 7, 9)		—	—	—	—	—	—	—	—	—	—	—
Dimensions (3P Unit Mount) in. (mm)	Height	6.47 (164)				11 (279)			13.38 (340)			
	Width	4.5 (114)				6 (152)			5.51 (140)			
	Depth	3.93 (100)				5.84 (148)			4.33 (110)			
Pages (Unit Mount) / (I-Line)		page 7-36 / Supplemental Section 9				page 7-37 / Supplemental Section 9			page 7-38 / Supplemental Section 9			

NOTE: All circuit breakers on this chart are UL Listed and CSA Certified unless otherwise noted.

[41] I-Line Q-frame circuit breakers are available 70–225 A only. 250 A Q-frame unit-mount circuit breakers are limited to Cu conductors only.
[42] Not available with electronic trip units
[43] Ungrounded UPS systems only. See page 7-45. Special DC J-Frame only.
[44] Dual UL and IEC ratings and CE markings on circuit breakers. For additional IEC ratings, see the Supplemental Digest, Section 10.
[45] For additional IEC ratings, see the Supplemental Digest Section 10.
[46] Requires circuit breaker with WB suffix .
[47] Factory-installed option only.
[48] Requires factory-installed “G” shunt trip and 3P module.
[49] Enclosure rating 1, 3R, 5 and 12.,

M-, P-, and R-Frame Molded Case Circuit Breakers

		PowerPacT 800 A M-Frame		PowerPacT 1200 A P-Frame				PowerPacT 3000 A R-Frame			
											
Circuit Breaker Type		MG	MJ	PG	PJ	PK	PL	RG	RJ	RK	RL
Number of Poles		2, 3	2, 3	2, 3, 4	2, 3, 4	2, 3, 4	2, 3, 4	2, 3, 4	2, 3, 4	2, 3, 4	2, 3, 4
Current Range (A)		300–800	300–800	100–1200	100–1200	100–1200	100–1200	240–3000	240–3000	240–3000	240–3000
Interrupting Ratings											
UL/CSA/NOM Rating (kA RMS) (50/60 Hz)	240 Vac	65	100	65	100	65	125	65	100	65	125
	480Y/277 Vac	35	65	35	65	50	100	35	65	65	100
	480 Vac	35	65	35	65	50	100	35	65	65	100
	600Y/347 Vac	18	25	18	25	50	25	18	25	65	50
	600 Vac	18	25	18	25	50	25	18	25	65	50
DC Ratings	250 Vdc	—	—	—	—	—	—	—	—	—	—
	500 Vdc *[50]*	—	—	—	—	—	—	—	—	—	—
IEC (kA RMS) (50/60 Hz) Icu/Ics *[51]*	240 Vac	50/25	65/35	50/25	65/35	50/25	125/65	50/25	65/35	85/65	125/65
	415 Vac	35/20	50/25	35/20	50/25	50/25	85/45	35/20	50/25	70/55	85/45
Special Ratings											
CCC		X	X	X	X	X	X	X	X	X	X
Fed. Specs W-C-375B/GEN		X	X	X	X	X	X	X	X	X	X
HACR (2P, 3P)		X	X	X	X	X	X	X	X	X	X
Connections/Terminations											
Unit Mount		X	X	X	X	X	X	X	X	X	X
I-Line™		X	X	X	X	X	X	X *[52]*	X *[52]*	X *[52]*	X *[52]*
Rear Connection		—	—	—	—	—	—	—	—	—	—
Drawout		—	—	X *[53]*	X *[53]*	X *[53]*	X *[53]*	—	—	—	—
Optional Lugs		X	X	X	X	X	X	X	X	X	X
Accessories and Modifications											
Shunt Trip		X	X	X	X	X	X	X	X	X	X
Undervoltage Trip		X	X	X	X	X	X	X	X	X	X
Auxiliary Switches		X	X	X	X	X	X	X	X	X	X
Alarm Switch		X	X	X	X	X	X	X	X	X	X
Motor Operator		—	—	X *[53]*	X *[53]*	X *[53]*	X *[53]*	—	—	—	—
Handle Operators		—	—	X *[53]*	X *[53]*	X *[53]*	X *[53]*	—	—	—	—
Mechanical Interlocks (3P)		—	—	X	X	X	X	—	—	—	—
Handle Padlock Attachment		X	X	X	X	X	X	X	X	X	X
Cylinder Lock (3P)		—	—	—	—	—	—	—	—	—	—
Optional GF Protection		—	—	X	X	X	X	X	X	X	X
Trip System Type											
Thermal-magnetic		—	—	—	—	—	—	—	—	—	—
Instantaneous-only (MCP)		—	—	—	X	X	—	—	—	—	—
Molded Case Switch (Automatic)		X	X	X	X	X	X	X	X	X	X
Electronic		X	X	X	X	X	X	X	X	X	X
Enclosures (page 7-82–page 7-84)											
General Purpose (NEMA 1)		X	X	X	X	X	X	—	—	—	—
Raintight (NEMA 3R)		X	X	X	X	X	X	—	—	—	—
Dust-tight (NEMA 12)		X	X	X	X	X	X	—	—	—	—
Watertight (NEMA 4, 4X, 5)		X	X	—	—	—	—	—	—	—	—
Explosion Proof (NEMA 7, 9)		—	—	—	—	—	—	—	—	—	—
Dimensions (3P Unit Mount)	Height–in. (mm)	12.80 (325)		16.20 (413)				15 (381)			
	Width—in. (mm)	8.30 (210)		8.30 (210)				16.50 (420)			
	Depth—in. (mm)	8.10 (205)		8.10 (205)				14.40 (366)			
Pages (Unit Mount) / (I-Line)		page 7-40 / Section 9		page 7-41, page 7-46 / Section 9				page 7-42, page 7-46 / Section 9			

NOTE: All circuit breakers on this chart are UL Listed and CSA Certified unless otherwise noted.

[50] Ungrounded UPS systems only. See page 7-45.
[51] Dual UL and IEC ratings and CE markings on circuit breakers. For additional IEC ratings, see the Supplemental Digest, Section 10.
[52] 1000 A and 1200 A only.
[53] 65/50 kA Icu/Ics for 450–600 A ratings.

MasterPacT MTZ Molded Case Circuit Breakers

		MasterPacT MTZ1 800–1600 A					MasterPacT MTZ2 800–6000 A				MasterPacT MTZ3 4000–6000 A			
														
Circuit Breaker Type		MTZ1-N	MTZ1-H	MTZ1-L1	MTZ1-L	MTZ1-LF *[54]*	MTZ2-N	MTZ2-H	MTZ2-L	MTZ2-LF *[54]*	MTZ2-H	MTZ2-L	MTZ3-H	MTZ3-L
Number of Poles		3 , 4	3, 4	3	3	3	3 , 4	3, 4	3	3	3 , 4	3	3 , 4	3
Current Range		400–1200	400–1200	400–1200	400–1200	400–1200	400–2000	400–2000	400–2000	400–2000	1200–3000	1200–3000	2000–6000	2000–6000
Interrupting Ratings														
UL/CSA Rating (kA RMS) (50/60 Hz)	240 Vac	50	65	100	200	200	65	100	200	200	100	200	100	200
	480Y/277 Vac	50	50	65	100	100	65	100	150	150	100	150	100	150
	480 Vac	50	50	65	100	100	65	100	150	150	100	150	100	150
	600Y/347 Vac	35	50	—	—	—	50	85	100	100	85	100	85	100
	600 Vac	35	50	—	—	—	50	85	100	100	85	100	85	100
DC Ratings	250 Vdc	—	—	—	—	—	—	—	—	—	—	—	—	—
	500 Vdc	—	—	—	—	—	—	—	—	—	—	—	—	—
IEC *[55]* (kA RMS) Icu/ Ics	240 Vac	—	—	—	—	—	—	—	—	—	—	—	—	—
	415 Vac	—	—	—	—	—	—	—	—	—	—	—	—	—
Special Ratings														
CCC		—	—	—	—	—	—	—	—	—	—	—	—	—
Fed. Specs W-C-375B/GEN		—	—	—	—	—	—	—	—	—	—	—	—	—
HACR (2P, 3P)		—	—	—	—	—	—	—	—	—	—	—	—	—
Connections/Terminations														
Unit Mount		X	X	X	X	X	X	X	X	X	X	X	X	X
I-Line™		—	—	—	—	—	—	—	—	—	—	—	—	—
Rear Connection		X	X	X	X	X	X	X	X	X	X	X	X	X
Drawout		X	X	X	X	X	X	X	X	X	X	X	X	X
Optional Lugs		—	—	—	—	—	—	—	—	—	—	—	—	—
Accessories and Modifications														
Shunt Trip		X	X	X	X	X	X	X	X	X	X	X	X	X
Undervoltage Trip		X	X	X	X	X	X	X	X	X	X	X	X	X
Auxiliary Switches		X	X	X	X	X	X	X	X	X	X	X	X	X
Alarm Switch		X	X	X	X	X	X	X	X	X	X	X	X	X
Motor Operator		X	X	X	X	X	X	X	X	X	X	X	X	X
Handle Operators		—	—	—	—	—	—	—	—	—	—	—	—	—
Mechanical Interlocks		X	X	X	X	X	X	X	X	X	X	X	X	X
Padlock Attachment		X	X	X	X	X	X	X	X	X	X	X	X	X
Optional GF Protection		X	X	X	X	X	X	X	X	X	X	X	X	X
Trip System Type														
Thermal-magnetic		—	—	—	—	—	—	—	—	—	—	—	—	—
Instantaneous-only (MCP)		—	—	—	—	—	—	—	—	—	—	—	—	—
Electronic		X	X	X	X	X	X	X	X	X	X	X	X	X
Enclosures														
General Purpose (NEMA 1)		—	—	—	—	—	—	—	—	—	—	—	—	—
Raintight (NEMA 3R)		—	—	—	—	—	—	—	—	—	—	—	—	—
Dust-tight (NEMA 12)		—	—	—	—	—	—	—	—	—	—	—	—	—
Watertight (NEMA 4, 4X, 5)		—	—	—	—	—	—	—	—	—	—	—	—	—
Explosion Proof (NEMA 7, 9)		—	—	—	—	—	—	—	—	—	—	—	—	—
Dimensions (3P Drawout) in. (mm)	Height	12.67 (322)					17.28 (439)				17.28 (439)		17.28 (439)	
	Width	11.25 (286)					17.74 (450)				17.74 (450)		30.94 (786)	
	Depth	13.54 (344)					18.50 (470)				18.50 (470)		18.50 (470)	
Pages		MasterPacT™ Power Circuit Breakers, page 7-66 and Catalog 0614CT1701												

NOTE: All circuit breakers on this chart are UL Listed and CSA Certified unless otherwise noted.

[54] Tested to show arc flash hazard risk category as reference by NFPA70E.
[55] See Catalog 0614CT1701 for additional ratings and other information.

MasterPacT NT, NW Molded Case Circuit Breakers

		MasterPacT 1200 A					MasterPacT 6000 A							
														
Circuit Breaker Type		NT-N	NT-H	NT-L1	NT-L	NT-LF [56]	NW-N	NW-H	NW-L	NW-LF [56]	NW-H	NW-L	NW-H	NW-L
Number of Poles		3 , 4	3, 4	3	3	3	3 , 4	3, 4	3	3	3 , 4	3	3 , 4	3
Current Range		100–1200	100–1200	100–1200	100–1200	100–1200	100–2000	100–2000	100–2000	100–2000	640–3000	640–3000	1200–6000	1200–6000
Interrupting Ratings														
UL/CSA/NOM Rating (kA RMS) (50/60 Hz)	240 Vac	50	65	100	200	200	65	100	200	200	100	200	100	200
	480Y/277 Vac	50	50	65	100	100	65	100	150	150	100	150	100	150
	480 Vac	50	50	65	100	100	65	100	150	150	100	150	100	150
	600Y/347 Vac	35	50	—	—	—	50	85	100	100	85	100	85	100
	600 Vac	35	50	—	—	—	50	85	100	100	85	100	85	100
DC Ratings	250 Vdc	—	—	—	—	—	—	—	—	—	—	—	—	—
	500 Vdc	—	—	—	—	—	—	—	—	—	—	—	—	—
IEC [57] (kA RMS) Icu/ Ics	240 Vac	—	—	—	—	—	—	—	—	—	—	—	—	—
	415 Vac	—	—	—	—	—	—	—	—	—	—	—	—	—
Special Ratings														
CCC		—	—	—	—	—	—	—	—	—	—	—	—	—
Fed. Specs W-C-375B/GEN		—	—	—	—	—	—	—	—	—	—	—	—	—
HACR (2P, 3P)		—	—	—	—	—	—	—	—	—	—	—	—	—
Connections/Terminations														
Unit Mount		X	X	X	X	X	X	X	X	X	X	X	X	X
I-Line™		—	—	—	—	—	—	—	—	—	—	—	—	—
Rear Connection		X	X	X	X	X	X	X	X	X	X	X	X	X
Drawout		X	X	X	X	X	X	X	X	X	X	X	X	X
Optional Lugs		—	—	—	—	—	—	—	—	—	—	—	—	—
Accessories and Modifications														
Shunt Trip		X	X	X	X	X	X	X	X	X	X	X	X	X
Undervoltage Trip		X	X	X	X	X	X	X	X	X	X	X	X	X
Auxiliary Switches		X	X	X	X	X	X	X	X	X	X	X	X	X
Alarm Switch		X	X	X	X	X	X	X	X	X	X	X	X	X
Motor Operator		X	X	X	X	X	X	X	X	X	X	X	X	X
Handle Operators		—	—	—	—	—	—	—	—	—	—	—	—	—
Mechanical Interlocks		X	X	X	X	X	X	X	X	X	X	X	X	X
Padlock Attachment		X	X	X	X	X	X	X	X	X	X	X	X	X
Cylinder Lock		—	—	—	—	—	—	—	—	—	—	—	—	—
Optional GF Protection		X	X	X	X	X	X	X	X	X	X	X	X	X
Trip System Type														
Thermal-magnetic		—	—	—	—	—	—	—	—	—	—	—	—	—
Instantaneous-only (MCP)		—	—	—	—	—	—	—	—	—	—	—	—	—
Molded Case Switch (Automatic)		X	X	X	X	X	X	X	X	X	X	X	X	X
Electronic		X	X	X	X	X	X	X	X	X	X	X	X	X
Enclosures														
General Purpose (NEMA 1)		—	—	—	—	—	—	—	—	—	—	—	—	—
Raintight (NEMA 3R)		—	—	—	—	—	—	—	—	—	—	—	—	—
Dust-tight (NEMA 12)		—	—	—	—	—	—	—	—	—	—	—	—	—
Watertight (NEMA 4, 4X, 5)		—	—	—	—	—	—	—	—	—	—	—	—	—
Explosion Proof (NEMA 7, 9)		—	—	—	—	—	—	—	—	—	—	—	—	—
Dimensions (3P Drawout) in. (mm)	Height	12.67 (322)					17.28 (439)				17.28 (439)		17.28 (439)	
	Width	11.25 (286)					17.74 (450)				17.74 (450)		30.94 (786)	
	Depth	13.00 (331)					18.38 (467)				18.38 (467)		18.38 (467)	
Pages		page 7-75 and Catalog 0613CT0001					page 7-75 and Catalog 0613CT0001							

NOTE: All circuit breakers on this chart are UL Listed and CSA Certified unless otherwise noted.

[56] Tested to show arc flash hazard risk category as reference by NFPA70E.
[57] See Catalog 0613CT0001 for additional ratings and other information.

QO Standard Plug-On Circuit Breakers

Square D brand QO miniature circuit breakers are plug-on products for use in QO load centers, NQOD and NQ panelboards, NQOD and NQ OEM interiors or Speed-D™ switchboard distribution panels. Bolt-on QOB circuit breakers are for use in NQOD and NQ panelboards or interiors. *[1]*

The Square D exclusive Qwik-Open™ mechanism, with a trip reaction within 1/60th of a second, is standard on all 1P 15 and 20 A QO circuit breakers.

QO 1P
1 Space
Required

QO 2P
2 Spaces
Required

QO 3P
3 Spaces
Required

QO2200 2P 200 A
4 Spaces Required

Table 7.1: Standard QO Plug-On Circuit Breakers

Amperes Rating *[2]*	1P—120/240 Vac	2P—120/240 Vac Common Trip	2P—240 Vac *[3]* Common Trip	3P—240 Vac Common Trip
10 k AIR				
10 A	QO110	QO210	—	QO310
15 A	QO115 *[4] [5]*	QO215 *[4]*	QO215H	QO315 *[4]*
20 A	QO120 *[4] [5]*	QO220 *[4]*	QO220H	QO320 *[4]*
25 A	QO125 *[4]*	QO225 *[4]*	QO225H OBS	QO325 *[4]*
30 A	QO130 *[4]*	QO230 *[4]*	QO230H	QO330 *[4]*
35 A	QO135 *[4]*	QO235 *[4]*	—	QO335 *[4]*
40 A	QO140 *[4]*	QO240 *[4]*	QO240H	QO340 *[4]*
45 A	QO145 OBS	QO245 *[4]*	—	QO345 *[4]*
50 A	QO150 *[4]*	QO250 *[4]*	QO250H OBS	QO350 *[4]*
60 A	QO160 *[4]*	QO260 *[4]*	QO260H OBS	QO360 *[4]*
70 A	QO170 *[4]*	QO270 *[4]*	QO270H OBS	QO370 *[4]*
80 A	—	QO280 *[4]*	QO280H OBS	QO380 *[4]*
90 A	—	QO290 *[4]*	QO290H OBS	QO390 *[4]*
100 A	—	QO2100 *[4]*	QO2100H	QO3100 *[4]*
110 A	—	QO2110 *[4]*	—	—
125 A	—	QO2125 *[4]*	—	—
150 A	—	QO2150 *[4] [6] [7]*	—	—
175 A	—	QO2175 *[4] [6] [7]*	—	—
200 A	—	QO2200 *[4] [6] [7]*	—	—
Molded Case Switch 60 A max.–240 Vac		—	QO200	QO300 OBS
Molded Case Switch 100 A max.–240 Vac		—	QO2000 OBS	QO3000 OBS
22 k AIR *[4]*				
15 A	QO115VH *[5]*	QO215VH *[8]*	—	QO315VH *[8]*
20 A	QO120VH *[5]*	QO220VH *[8]*	—	QO320VH *[8]*
25 A	QO125VH OBS	QO225VH *[8]*	—	QO325VH *[8]*
30 A	QO130VH	QO230VH *[8]*	—	QO330VH *[8]*
40 A	QO140VH	QO240VH *[8]*	—	QO340VH *[8]*
50 A	QO150VH	QO250VH *[8]*	—	QO350VH *[8]*
60 A	QO160VH	QO260VH *[8]*	—	QO360VH *[8]*
70 A	QO170VH	QO270VH *[8]*	—	QO370VH *[8]*
80 A	—	QO280VH *[8]*	—	QO380VH *[8]*
90 A	—	QO290VH *[8]*	—	QO390VH *[8]*
100 A	—	QO2100VH *[8] [9]*	—	QO3100VH *[8]*
110 A	—	QO2110VH *[8] [9]*	—	—
125 A	—	QO2125VH *[8] [9]*	—	—
150 A	—	QO2150VH *[6] [8] [7]*	—	—
175 A	—	QO2175VH OBS	—	—
200 A	—	QO2200VH *[6] [8] [7]*	—	—
42 k AIR *[4]*				
40 A	—	QOH240 OBS	—	—
45 A	—	QOH245 OBS	—	—
50 A	—	QOH250 OBS	—	—
60 A	—	QOH260 *[10]*	—	—
70 A	—	QOH270	—	—
80 A	—	QOH280	—	—
90 A	—	QOH290	—	—
100 A	—	QOH2100	—	—
110 A	—	QOH2110 *[10]*	—	—
125 A	—	QOH2125	—	—
65 k AIR *[4]*				
15 A	QH115 OBS	QH215 OBS	—	QH315 OBS
20 A	QH120 *[5]*	QH220	—	QH320 OBS
25 A	QH125 OBS	QH225 OBS	—	QH325 *[10]*
30 A	QH130 OBS	QH230	—	QH330 OBS

OBS This product is obsolete.

Refer to page 7-2 for Interrupting Ratings, Accessories, and Dimensions.

[1] See Digest Section 1 for load centers and Section 9 for panelboards and interiors.
[2] 10–30 A circuit breakers are suitable for use with 60ºC or 75ºC conductors. 35–125 A circuit breakers are suitable for use with 75ºC conductors.
[3] UL Listed 5 k AIR on corner grounded Delta systems.
[4] UL Listed as HACR type for use with air conditioning, heating and refrigeration equipment haing motor group combinations and marked for use with HACR type circuit breakers.
[5] UL Listed as SWD (switching duty) rated. Suitable for switching 120 Vac fluorescent lighting loads.
[6] Requires four spaces (1 AWG–300 kcmil Al/Cu.) Suitable for switching 120 Vac fluorescent lighting loads.
[7] Not suitable for use in 3Ø panels. Use only in 1Ø panel rated 150 A or greater.
[8] UL Listed for use ahead of QO, QO-GFI, QO-EPD, QOT, QO-AFI, and QO-PL 10 k AIR circuit breakers to permit their application at 22 kA fault level.
[9] 100 A maximum branch mounted opposite.
[10] Order only. Contact your local Field Office.

Table 7.2: QO/QOB 48 Vdc 5 kA

Ampere Rating	Poles	Suffix
10–60 A	2	5272

QO/QOB Ring Terminal

Table 7.3: QO/QOB Ring Terminal—Factory-Installed Only

Ampere Rating	Poles	Suffix
10–30 A	1, 2, 3	5237
35–60 A	1,2	5238
35–50 A	3	
70–110 A	2	5273
60–100 A	3	

Wire Sizes for QO/QOB Circuit Breakers

Table 7.4: Wire Sizes for QO/QOB Circuit Breakers

Circuit Breaker Type	Ampere Rating *[11]*	Wire Size (AWG/kcmil)
QO 1P	10–30 A	14–8 Al/Cu
	10–30 A	(2) 14–10 Cu
	35–70 A	8–2 Al/Cu
QO 2P	10–30 A	14–8 Al/Cu
	10–30 A	(2) 14–10 Cu
	35–70 A	8–2 Al/Cu
	80–125 A	4–2/0 Al/Cu
	150–200 A	4–300 Al/Cu
QO 3P	10–30 A	14–8 Al/Cu, (2) 14-10 Cu
	35–70 A	8–2 Al/Cu
	80–125 A	4–2/0 Al/Cu
QOB-VH	110–150 A	4–300 Al/Cu
QOT	15–20 A	12–8 Al 14–8 Cu
QO-AFI, QO-GFI or QO-EPD	15–30 A	12–8 Al 14–8 Cu
	40, 50, 60 A	12–4 Al 14–6 Cu
QO-PL	10–60 A	12–2 Al 14–2 Cu

QOT and QO Tandem Circuit Breakers

QOT tandem circuit breakers have a mounting cam as shown. Installation into a QO load center can only be made in those positions having a mounting pan rail slot. Meets Paragraph 408.54 of the NEC®. UL Listed as Class CTL.

QOT 1P Tandem
1 Space Required

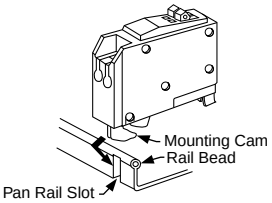


Table 7.5: QOT Tandem Circuit Breakers (CTL)—Not Compatible with Plug-on Neutral Systems

Ampere Rating *[11]*	Cat. No. *[12]*
1P—120/240 Vac	
15 A and 15 A	QOT1515
15 A and 20 A	QOT1520
20 A and 20 A	QOT2020
2P—120/240 Vac Common Trip	
Order two QOT1515 or QOT2020 circuit breakers and handle tie QOTHT for common switching of center two poles.	

Table 7.6: QO Tandem Circuit Breakers (non-CTL)—Compatible with Plug-on Neutral Systems

Ampere Rating *[11]*	Cat. No. *[12]*
1P—120/240 Vac—1 Space Required	
15 A and 15 A	QO1515
15 A and 20 A	QO1520
20 A and 20 A	QO2020
20 A and 30 A	QO2030
30 A and 20 A	QO3020
Two 1P Individual Trip—120/240 Vac—2 Spaces Required	
15 A and 15 A	Order two QO1515 or QO2020 circuit breakers and handle tie QOTHT
15 A and 20 A	
20 A and 20 A	—
20 A and 30 A	QO20303020 *[13]*
30 A and 20 A	—

[11] 10–30 A circuit breakers are suitable for use with 60ºC or 75ºC conductors. 35–125 A circuit breakers are suitable for use with 75ºC conductors.
[12] UL Listed as HACR type for use with air conditioning, heating and refrigeration equipment haing motor group combinations and marked for use with HACR type circuit breakers.
[13] Includes two circuit breakers (one QO2030 and one QO3020) and handle tie QOTHT.

1P
QO-CAFI
Plug-On Neutral

1P
QO-CAFI
Pigtail

QO Arc-Fault Circuit Breaker (QO-CAFI)

QO arc-fault circuit breakers provide protection for Series and Parallel Type Arcing as required by the NEC and local code adoption, and comply with UL1699.

Table 7.7: QO-CAFI Circuit Breakers

Circuit Breaker Type *[14]*	Ampere Rating	One–Pole 120 Vac		Two–Pole 120/240 Vac	
		10 k AIR 1 Space Required	22 k AIR 1 Space Required	10 k AIR 2 Space Required	22 k AIR 2 Space Required
Combination Arc-fault Interrupter (Pigtail Neutral)	15 20	QO115CAFI QO120CAFI	QO115VHCAFI QO120VHCAFI	QO215CAFI *[15]* QO220CAFI *[15]*	QO215VHCAFI OBS QO220VHCAFI OBS
Plug-On Neutral Combination Arc-fault Interrupter	15 20	QO115PAF QO120PAF	QO115VHPAF QO120VHPAF	—	—

OBS This product is obsolete.

1P QO-DF
Plug-on Neutral

1P QO-DF
Pigtail

QO Dual Function Circuit Breaker

QO Combination Arc Fault and Ground Fault Circuit Interrupters (Dual Function) provide overload and short circuit protection, plus arc fault and ground fault protection in accordance with the NEC, UL1699 and UL943.

Table 7.8: QO-DF Circuit Breakers

Circuit Breaker Type *[14]*	Ampere Rating	1P 120 Vac 10 k AIR 1 Space Required	1P 120 Vac 22 k AIR 1 Space Required
Combination Arc-fault and Ground Fault Circuit Interrupter (Pigtail Neutral)	15 20	QO115DF QO120DF	QO115VHDF OBS QO120VHDF
Plug-On Neutral Combination Arc-fault and Ground Fault Circuit Interrupter	15 20	QO115PAFGF QO120PAFGF	QO115VHPAFGF QO120VHPAFGF

OBS This product is obsolete.

1P
QO-GFI

2P
QO-GFI

QO Ground-Fault Circuit Breakers (GFI)

Qwik-Gard™ circuit breakers provide overload and short circuit protection, combined with Class A ground fault protection. Class A denotes a ground fault circuit interrupter that will trip when a fault current to ground is 6 mA or more, for people protection. Do not connect to more than 250 feet of load conductor for the total one-way run to prevent nuisance tripping.

Table 7.9: QO-GFI Circuit Breakers

Circuit Breaker Type	Ampere Rating *[16]*	Qwik-Gard Circuit Breakers With Ground Fault Circuit Interrupter			
		1P 120 Vac		2P Common Trip 120/240 Vac	3P Common Trip 208Y/120 Vac
		10 k AIR 1 Space Required	22 k AIR 1 Space Required	10 k AIR 2 Spaces Required	10 k AIR 3 Spaces Required
Ground-Fault Circuit Interrupter (Pigtail Neutral)	15	QO115GFI	QO115VHGFI	QO215GFI	QO315GFI
	20	QO120GFI	QO120VHGFI	QO220GFI	QO320GFI
	25	—	—	QO225GFI	—
	30	QO130GFI	QO130VHGFI OBS	QO230GFI	QO330GFI
	35	—	—	QO235GFI	—
	40	—	—	QO240GFI	QO340GFI
	45	—	—	QO245GFI	—
	50	—	—	QO250GFI	QO350GFI
	60	—	—	QO260GFI *[17]*	—
Plug-On Neutral Ground-Fault Circuit Interrupter	15	QO115PGFI*[18]*	—	—	—
	20	QO120PGFI*[18]*	—	—	—

OBS This product is obsolete.

[14] UL Listed as HACR type for use with air conditioning, heating and refrigeration equipment haing motor group combinations and marked for use with HACR type circuit breakers.
[15] For 120/240 V only, not for 208Y/120 V.
[16] 10–30 A circuit breakers are suitable for use with 60°C or 75°C conductors. 35–60 A circuit breakers are suitable for use with 75°C conductors.
[17] Suitable only for feeding 240 Vac and 208 Vac two-wire loads. Does not contain load neutral connection.
[18] New Plug-On Neutral

QO-EPD/EPE Circuit Breakers

QO-EPD/EPE circuit breakers provide overload and short circuit protection combined with Class B ground fault protection. They are designed to provide ground fault protection of equipment at a 30 mA level (EPD) or 100 mA level (EPE). They are not designed to protect people from electrical shock.

QO 1P
With Shunt Trip

Table 7.10: QO-EPD Circuit Breakers

Ampere Rating *[19]*	1P 120 Vac 10 k AIR 1 Space Required	2P Common Trip 120/240 Vac 10 k AIR 2 Spaces Required	3P Common Trip 240 Vac 10 k AIR 3 Spaces Required	
15	QO115EPD	QO215EPD	QO315EPD OBS	QO315EPE *[20]*
20	QO120EPD	QO220EPD	QO320EPD *[20]*	QO320EPE *[20]*
25	QO125EPD OBS	QO225EPD	—	—
30	QO130EPD	QO230EPD	QO330EPD *[20]*	QO330EPE *[20]*
40	—	QO240EPD	QO340EPD *[20]*	QO340EPE *[20]*
50	—	QO250EPD	QO350EPD *[20]*	QO350EPE *[20]*
60	—	QO260EPD *[21]*	—	—

OBS This product is obsolete.

QO Switch Neutral Common Trip Circuit Breakers (QO-SWN)

Switch Neutral Common Trip 2008 NEC® 514.11

Two-wire
QO-SWN

Three-wire
QO-SWN

Table 7.11: QO-SWN Circuit Breakers

Ampere Rating *[22]*	2 Wire 120 Vac 10 k AIR 2 Spaces Required	3 Wire 120/240 Vac 10 k AIR 3 Spaces Required
10	QO210SWN OBS	QO310SWN
15	QO215SWN	QO315SWN OBS
20	QO220SWN	QO320SWN
25	QO225SWN OBS	QO325SWN
30	QO230SWN OBS	QO330SWN OBS
40	QO240SWN OBS	QO340SWN OBS
50	QO250SWN OBS	QO350SWN OBS

OBS This product is obsolete.

QO High Intensity Discharge Circuit Breakers (QO-HID)

HID circuit breakers are for use on circuits feeding fluorescent and high intensity discharge (HID) lighting systems such as mercury vapor, metal halide, or high pressure sodium. These circuit breakers are physically interchangeable with QO circuit breakers.

Table 7.12: QO-HID Circuit Breakers

Ampere Rating *[22]*	1P 120/240 Vac 10 k AIR 1 Space Required	2P Common Trip 120/240 Vac 10 k AIR 2 Spaces Required	3P Common Trip 240 Vac 10 k AIR 3 Spaces Required
15	QO115HID OBS	QO215HID OBS	QO315HID OBS
20	—	QO220HID	QO320HID
25	QO125HID OBS	QO225HID OBS	QO325HID OBS
30	QO130HID OBS	QO230HID OBS	QO330HID OBS
40	QO140HID OBS	QO240HID OBS	—
50	QO150HID OBS	QO250HID OBS	—

OBS This product is obsolete.

QO Key Operated Circuit Breakers (QO-K)

Key operated QO circuit breakers are available in single-pole construction and can be mounted in any single-pole space which will accept a standard QO circuit breaker. These circuit breakers can be turned ON or OFF or to RESET with a special key (catalog number QOK10) included with the circuit breaker. These circuit breakers are UL Listed and available as shown in the table.

QO-K Key Operated

Table 7.13: QO-K Circuit Breakers

120 Vac—10 k AIR (1 Space Required)			
Ampere Rating *[22]*	Cat. No.	Ampere Rating *[22]*	Cat. No.
10	QO110K OBS	25	QO125K
15	QO115K OBS	30	QO130K OBS
20	QO120K OBS	—	—

OBS This product is obsolete.

[19] 10–30 A circuit breakers are suitable for use with 60ºC or 75ºC conductors. 35–60 A circuit breakers are suitable for use with 75ºC conductors.
[20] See note in Instruction Bulletin when using in an enclosure with a QO403 or QON prefix.
[21] Suitable only for feeding 240 Vac and 208 Vac two-wire loads. Does not contain load neutral connection.
[22] 10–30 A circuit breakers are suitable for use with 60oC or 75oC conductors. 35–60 A circuit breakers are suitable for use with 75oC conductors.

QO High Magnetic Trip Circuit Breakers (QO-HM)

High magnetic trip circuit breakers are recommended for applications where high initial inrush may occur and for individual dimmer applications.

Table 7.14: QO-HM Circuit Breakers

120 Vac—10 k AIR	
Ampere Rating *[23]*	**1P**
15 A	QO115HM *[24] [25]*
20 A	QO120HM *[24] [25]*

Non-Automatic (Standard) Miniature Switches

Miniature non-automatic switches have the same physical packaging as miniature circuit breakers, but open only when the handle is switched to the OFF position.

Non-automatic switches provide no overcurrent protection or short circuit protection. They must not be used on systems that have an available fault current greater than the values listed in the table. Non-automatic switches are UL Listed per UL 1087 and are CSA certified.

Table 7.15: QO Non-Automatic Miniature Switches, 240 Vac 10 kA

Ampere Rating	2P	3P
60	QO200	QO300
100	QO2000 OBS	QO3000

OBS This product is obsolete.

[23] 10–30 A circuit breakers are suitable for use with 60oC or 75oC conductors. 35–60 A circuit breakers are suitable for use with 75oC conductors.
[24] UL Listed as HACR type for use with air conditioning, heating and refrigeration equipment haing motor group combinations and marked for use with HACR type circuit breakers.
[25] UL Listed as SWD (switching duty) rated. Suitable for switching 120 Vac fluorescent lighting loads.

Accessories for QO/QOB Circuit Breakers

Table 7.16: Accessories for use with QO and QOB Miniature Circuit Breakers

Description		Cat. No.	Schedule
Handle Attachments			
Handle Tie	Converts any two adjacent 120/240 Vac 1P QO circuit breakers to independent trip 2P Converts any two adjacent 120/240 Vac1P side-by-side QOT circuit breakers to independent trip 2P	QO1HT QOTHT QO3HT	DE2E DE2E
Handle Clamp	Clamp for holding QO 1P handle in ON or OFF position Clamp for holding QO or Q1 either 1P, 2P or 3P circuit breaker handles in ON or OFF position	QO1LO HLO1	DE2E DE2E
Handle Padlock Attachment for Padlocking in ON or OFF position	For padlocking 1P QO circuit breaker in ON or OFF position Loose attachment Fixed attachment	QOHPL QO1PA	DE2E DE2E
	For padlocking 1P side-by-side QOT circuit breaker in ON or OFF position	QOTHPA OBS	DE2E
	For padlocking 2P QO-GFI circuit breakers in either ON or OFF position, fixed attachment.	GFI2PA	DE2A
	For 2P and 3P QO and Q1 standard circuit breakers which require padlocking in either ON or OFF position. Loose attachment Fixed attachment	QO1HPL QO1PL	DE2E DE2E
Handle Padlock Attachment for Padlocking in OFF position	For padlocking 1P QO circuit breaker in OFF position only, fixed attachment.	QOADV1PAF	DE2E
	For padlocking 2P and 3P QO circuit breakers in OFF position only, fixed attachment.	QO2PAF	DE2E
	For padlocking 1P QO-GFI, QO-CAFI, QO-DF and QO-EPD circuit breakers in OFF position only, fixed attachment.	QOADV1PAF	DE2E
	For padlocking 2P QO-GFI, QO-CAFI and QO-EPD circuit breakers in OFF position only, fixed attachment.	QOGFI2PAF	DE2E
Ring Terminal	Ring terminals are available as a factory-installed option.	See Section 7	DE2A
Sub-feed Lugs	60 A 2P plug-on – 2 spaces required (6–2 Al/Cu) 125 A 2P plug-on – 2 spaces required (12–2/0 Al/Cu) 225 A 2P plug-on – 4 spaces required (4–300 Al/Cu) 125 A 3P plug-on – 3 spaces required (12–2/0 Al/Cu)	QO60SL OBS QO2125SL QO2225SL *[26]* QO3125SL	DE2A DE2A DE2A DE3
Mechanical Interlock Attachment	For interlocking the handles of two 2P or one 2P and one 1P QO and Q1 circuit breakers mounted side-by-side so that only one circuit breaker can be ON at a time (Not QOU)	QO2DTI	DE2E
With Retaining Kit	QO2DTI mechanical interlock attachment with retaining kits for securing two adjacent back-fed circuit breakers in dual power supply applications. Can be used with (2) 2Ps or (1) 2P and (1) 1P QO circuit breakers in QO816L100 load centers.	QO2DTIM	DE2E

OBS This product is obsolete.

QO1PA

QO1PL

QO1HT

HLO1

QO1PAF

QO2DTI

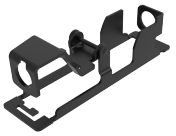
QO1HPL

QOTHPA

QO1LO

QOHPL

QO2PAF



QOADV1PAF

Factory-Installed Accessories for QO and QOB Miniature Circuit Breakers

Factory-installed electrical accessories take up an additional pole space on QO, QO-GFI, QO-EPD, QO-SWN and QOU circuit breakers. All AC electrical accessories shown below are rated for 50/60 Hz. Accessories are not available for QOB-VH (2P 150 A and 3P 110–150 A) circuit breakers or QO, QOU molded case switches. QO circuit breakers will accept only one accessory per circuit breaker. Undervoltage trip is not available on

[26] Not suitable for use in 3Ø panels. Use only in 1Ø panel rated 150 A or greater.

miniature circuit breakers. Factory-installed accessories are not available for QO-AFI or QO-CAFI Arc Fault Circuit Breakers, QO-CAFI, QO-DF, or QO-PDF circuit breakers, or on QO2150, QO2175, or QO2200 circuit breakers.

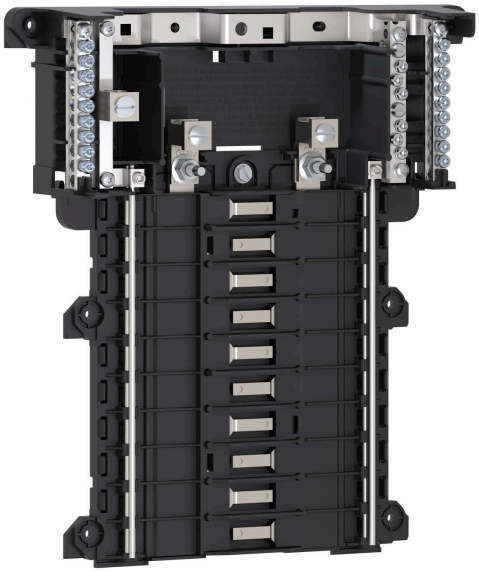
Table 7.17: Factory-Installed Accessories for QO/QOB Circuit Breakers

Accessory	Description	Rated Voltage	Coil Burden	Cat. No. Suffix
Shunt Trip	Trips the circuit breaker from a remote location by means of a trip coil energized from a separate circuit. A 120 Vac shunt trip will operate at 55% or more of rated voltage. All other shunt trips will operate at 75% or more of rated voltage. **Application** • For use with momentary or maintained push button. • Not available on QO-GFI, QO-EPD. QO-AFI, QO-CAFI, QO-DF, or QO-PDF. • Shunt trip terminals accept (2) 0.14– 0.12 AWG Cu.	12 Vac/Vdc 24 Vac/Vdc	60 VA 168 VA	-1042
		120 Vac 208 Vac 240 Vax	72 VA 228 VA 288 VA	-1021

Accessory	Description	Contact Comb.	Max. Voltage	Max.	Cat. No. Suffix
Auxiliary Switches	Monitors circuit breaker contact status and provides a remote signal indicating the circuit breaker contacts are OPEN or CLOSED. **Application** • Auxiliary switch terminals accept (2) 14–12 AWG Cu leads. • Leads (EH): Yellow for "A'', Blue for "B'', Striped common 18 AWG Cu.	1A 1B	120 Vac 120 Vac	5 A 5 A	-1200 -1201
Alarm Switches	Used with control circuits and is actuated only when the circuit breaker has tripped. Standard construction includes a normally-open contact. **Application** • Leads: Alarm switch terminals accept (2) 14–12 AWG Cu leads.	1A	120 Vac	5 A	-2100

QO Mounting Bases

SN12125



QON120L125P1

QON3B

Table 7.18: QO OEM Mounting Bases—UL Recognized Components

Voltage System	Main Lug Rating	Spaces	Max. No. 1P Circuits	Mounting Bases Cat. No.	Main Wire Size AWG/kcmil
QO Plug-On Mounting Bases—Accepts Only QO Plug-On Circuit Breakers - Not Compatible With QO Plug-On Neutral Circuit Breakers					
1Ø2W 240 Vac Max. 10 k AIC (Without Neutral Assembly)	70 A	2	2	QON2L70	14–4 Cu, 12–3 Al
	125 A	4	4	SK9948BW	12–1/0 Cu/Al
	125 A	4	4	SK9842	12–1/0 Cu/Al
	125 A	6	6	SK9795	12–1/0 Cu/Al
	125 A	6	6	SK9801	12–1/0 Cu/Al
	150 A	6	6	SK9796BW	8–3/0 Cu/Al
	150 A	8	8	SK9797	8–3/0 Cu/Al
QO Plug-On Mounting Bases—Accepts Only QO Plug-On Circuit Breakers - Not Compatible With QO Plug-On Neutral Circuit Breakers					
1Ø3W 240 Vac Max. 10 k AIC	40 A	2	2	QON2L40	14–6 Cu, 12–6 Al
	70 A	2	4	QON24L70	14–4 Cu, 12–3 Al
	100 A	6	12	QON612L100	8–1/0 Cu/Al
	100 A	8	16	QON816L100	8–1/0 Cu/Al
QO Plug-On Neutral Mounting Bases - Compatible with QO Plug-On Circuit Breakers and QO Plug-On Neutral Circuit Breakers					
1Ø3W 240 Vac Max. 10 k AIC	125 A	12	24	QON112L125PI	4–2/0 Cu/Al
	125 A	20	24	QON120L125PI	4–2/0 Cu/Al
	200 A	12	24	QON112L200PI	4–250 Cu/Al
	200 A	24	36	QON124L200PI	4–250 Cu/Al
	200 A	24	36	QON124L200PDL	(2) 4–300 Cu/Al
	200 A	30	40	QON130L200PI	4–250 Cu/Al
	225 A	42	52	QON142L225PI	4–300 Cu/Al
	225 A	52	72	QON154L225P	4–300 Cu/Al
	225 A	60	72	QON160L225P	4–300 Cu/Al
QO Plug-On Mounting Bases—Accepts Only QO Plug-On Circuit Breakers - Not Compatible With QO Plug-On Neutral Circuit Breakers					
3Ø3W 240 Vac Max. 10 k AIC (Without Neutral Assy.)	125 A	12	12	QON312L125	4–2/0 Cu/Al
	125 A	20	20	QON320L125	4–2/0 Cu/Al
	125 A	24	24	QON324L125	4–2/0 Cu/Al
	200 A	18	18	QON318L200	4–300 Cu/Al
	200 A	24	24	QON324L200	4–300 Cu/Al
	200 A	30	30	QON330L200	4–300 Cu/Al
	225 A	42	42	QON342L225	4–300 Cu/Al
QO Plug-On Mounting Bases—Accepts Only QO Plug-On Circuit Breakers - Not Compatible With QO Plug-On Neutral Circuit Breakers					
3Ø4W 240 Vac Max. 10 k AIC	60 A	3	3	QON403L60N	12–6 Cu/Al
	125 A	12	12	QON312L125I	4–2/0 Cu/Al
	125 A	20	20	QON320L125I *[27]*	4–2/0 Cu/Al
	125 A	24	24	QON324L125I	4–2/0 Cu/Al
	200 A	18	18	QON318L200I	4–300 Cu/Al
	200 A	24	24	QON324L200I	4–300 Cu/Al
	200 A	30	30	QON330L200I *[27]*	4–300 Cu/Al
	225 A	42	42	QON342L225I	4–300 Cu/Al
QO Plug-On Mounting Bases—Accepts Only QO Plug-On Circuit Breakers - Not Compatible With QO Plug-On Neutral Circuit Breakers					
1Ø2W 240 Vac Max. 10 k AIC (Without Neutral Assembly)	70 A 70 A 70 A	1 2 3	1 2 3	QOMB1 QOMB2 QOMB3	14–4 Cu 12–2 Al 14–4 Cu 12–2 Al 14–4 Cu 12–2 Al
QOB Bolt-On Mounting Bases—Accepts only QOB Bolt-On Circuit Breakers					
3Ø3W 240 Vac Max.10 k AIC (Without Neutral Assembly)	100 A	3	3	QON3B	12–1 Cu/Al

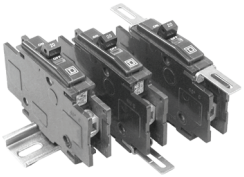
[27] Also IEC rated and CE marked for IEC 60439-1. Use only Square D brand Type QOXC, QOXD, QOHX and QOE circuit breakers for 415Y/240 Vac max. systems.

Table 7.19: Solid Neutral Assemblies

Main Lug Rating	Number of Branch Neutral Terminals	Cat. No.	Main Neutral Lug Wire Size Cu/Al	Branch Neutral Terminal Wire Size	
				Cu	Al
125 A	12	SN12125	4–2/0 AWG	14–4 AWG	12–4 AWG
125 A	20	SN20	4–2/0 AWG	14–4 AWG	12–4 AWG
200 A	12	SN12200	4 AWG–300 kcmil	14–4 AWG	12–4 AWG
200 A	30	SN30	4 AWG–300 kcmil	14–4 AWG	12–4 AWG
225 A	42	SN42	4 AWG–300 kcmil	14–4 AWG	12–4 AWG

Table 7.20: Accessories for US Mounting Base for UL489 C60

Description	Cat. No.
Main lug kit for US mounting bases, 1 lug per kit, for 6 AWG to 300 kcmil cable	USMBLK
Terminal cover for US mounting base; provides IP20 ingress protection per IEC 60529; suitable for jumper bars or cable	USMBTC



Low Ampere QOU

Low Ampere QOU Miniature Circuit Breakers

QOU unit mount miniature circuit breakers (cable-in/cable-out) are ideal for OEM applications. They have the Square D™ circuit breaker's unique Visi-Trip™ feature and can be DIN rail-mounted or surface- or flush-mounted using mounting feet. Mounting feet not provided *[28]*.

General Specifications Common to All Low Ampere QOU Circuit Breakers

- For convenient flush mount, surface mount or DIN mount (symmetrical rail 35 x 7.5 DIN/EN 50 022)
- Single handle with internal common trip
- Terminal lug wire size (1) 14–2 AWG Cu or Al
- Reversible line and load lugs
- Field-installable quick connectors
- UL Listed 48 Vdc (5 k AIR)
- UL Listed as HACR Type: 10–70 A
- High magnetic trip circuit breakers (QOU-HM) are recommended for applications where high initial inrush may occur and for individual dimmer applications.
- For DIN mounting rails, see IEC Starters and Relays, Section 18.

Table 7.21: QOU Low Ampere Miniature Circuit Breakers

Ampere Rating	Cat. No.			
	1P 120/240 Vac	2P 120/240 Vac	2P 240 Vac *[29]*	3P 240 Vac
10 k AIR				
10 A	QOU110	QOU210	—	QOU310
15 A	QOU115	QOU215	QOU215H	QOU315
20 A	QOU120	QOU220	QOU220H	QOU320
25 A	QOU125	QOU225	QOU225H OBS	QOU325
30 A	QOU130	QOU230	QOU230H	QOU330
35 A	QOU135	QOU235	—	QOU335
40 A	QOU140	QOU240	—	QOU340
45 A	QOU145 OBS	QOU245	—	QOU345
50 A	QOU150	QOU250	—	QOU350
60 A	QOU160	QOU260	—	QOU360
70 A	QOU170	QOU270	—	QOU370
22 k AIR				
15 A	QOU115VH	QOU215VH	—	QOU315VH OBS
20 A	QOU120VH	QOU220VH	—	QOU320VH
25 A	QOU125VH OBS	QOU225VH OBS	—	QOU325VH OBS
30 A	QOU130VH	QOU230VH	—	QOU330VH
35 A	QOU135VH OBS	QOU235VH OBS	—	—
40 A	QOU140VH OBS	QOU240VH OBS	—	—
45 A	QOU145VH OBS	QOU245VH OBS	—	—
50 A	QOU150VH OBS	QOU250VH	—	—
60 A	QOU160VH	QOU260VH	—	—

OBS This product is obsolete.

Table 7.22: QOU-HM Miniature Circuit Breakers (10 k AIR)

Ampere Rating	Cat. No.			
	1P 120/240 Vac	2P 120/240 Vac	2P 240 Vac	3P 240 Vac
15 A	QOU115HM	—	—	—
20 A	QOU120HM	—	—	—

Table 7.23: QYU UL1077 Recognized Supplementary Protectors (5 k AIR)

Ampere Rating	Cat. No.			
	1P 277 Vac	2P 120/240 Vac	2P 240 Vac	3P 240 Vac
10 A	QYU110 OBS	—	—	—
15 A	QYU115 OBS	—	—	—
20 A	QYU120 OBS	—	—	—
25 A	QYU125 OBS	—	—	—
30 A	QYU130 OBS	—	—	—

OBS This product is obsolete.

[28] See QOU Accessories, page 7-21.
[29] QOU-H interrupting rating is 10 kA at 240 Vac.

High Ampere QOU

High Ampere QOU Circuit Breakers

General Specifications Common to All High Ampere QOU Circuit Breakers

- Flush mount, surface mount, and DIN rail mount.
- Internal common trip.
- Non-reversible line and load lugs.
- Terminal lug wire size (1) 12– 2/0 AWG Cu or Al.
- UL Listed 60 Vdc per pole (5 k AIR). (**Note:** except switches)
- UL Listed as HACR type, 80–125 A.
- Non-automatic switches have the same physical packaging as miniature circuit breakers, but provide no overcurrent or short circuit protection. They are UL Listed per UL1087 and are CSA certified.

Table 7.24: QOU High Ampere Miniature Circuit Breakers (10 k AIR)

Ampere Rating	Cat. No.			
	1P 120/240 Vac	2P 120/240 Vac	2P 240 Vac	3P 240 Vac
80 A	QOU180	QOU280	—	QOU380
90 A	QOU190 OBS	QOU290	—	QOU390
100 A	QOU1100	QOU2100	—	QOU3100
125 A	—	QOU2125	—	—

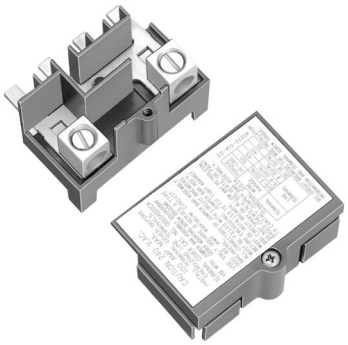
OBS This product is obsolete.

Table 7.25: QOU Non-Automatic Switches

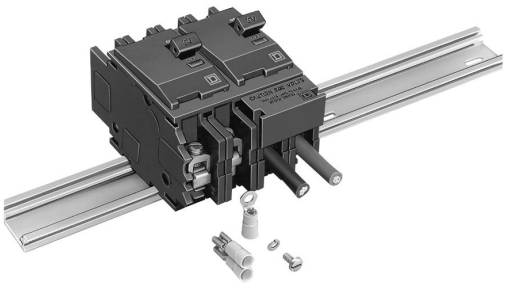
Ampere Rating	Cat. No.			
	1P 120 Vac	2P 120/240 Vac	2P 240 Vac	3P 240 Vac
60 A	—	—	QOU200	QOU300
100 A	—	—	QOU2000 OBS	QOU3000 OBS
125 A	—	—	QOU20001	QOU30001 OBS

OBS This product is obsolete.

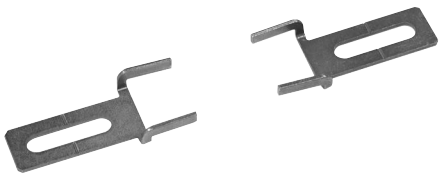
Interrupting ratings see page 7-2
Accessories see page 7-21
Dimensions see page 7-82



QOU14100JBAF



2P DIN-Mounted QOU Circuit Breaker



Mounting Foot
QOUMF1

QOU Accessories

Table 7.26: Accessories for QOU Low Ampere Circuit Breakers (Except as Noted)

Description	Order Qty.	Cat. No.
Factory-installed ring tongue terminal, 10–32 screw, for 1P, 2P, 3P QOU, 10–60 A	—	Suffix -5283
Hex drive 5/32 in. wire binding screw for QOU	—	Suffix -5280
For padlocking 1P low ampere QOU circuit breaker in OFF or ON position	—	QOU1PA OBS
For padlocking 2P and 3P low ampere QOU circuit breaker in OFF or ON position	—	QOU1PL
For padlocking 1P low ampere QOU circuit breaker in OFF position only	—	QOU1PAFLA
For padlocking 2P and 3P low ampere QOU circuit breaker in OFF position only	—	QOU2PAFLA
For padlocking 2P and 3P high ampere QOU circuit breaker in OFF position only	—	Suffix -7100
Handle lock-out, ON or OFF position	—	HLO1
4P 100 A Jumper bar assy. w/front wiring with base, cover and screw	1	QOU14100JBAF
4P 100 A Jumper bar assy. w/right side wiring with base, cover and screw	1	QOU14100JBAR OBS
4P 100 A Jumper bar assy. w/left side wiring with base, cover and screw	1	QOU14100JBAL
1Ø, 4P, 100 A Jumper bar base with front wiring	40	QOU14100BAFB
1Ø, 4P, 100 A Jumper bar base with left side wiring	40	QOU14100BALB
1Ø, 4P, 100 A Jumper bar base with right side wiring	40	QOU14100BARB
4P Jumper bar cover	40	QOU14100CAB
Mounting screw for jumper bar cover	40	QOU1CMSB OBS
6P 150 A Jumper bar assy. w/front wiring with base, cover and screw	1	QOU16150JBAF
1Ø, 6P, 150 A Jumper bar base with front wiring	40	QOU16150BAFB
1Ø, 6P, 150 A Jumper bar base with left side wiring	40	QOU16150BALB OBS
1Ø, 6P, 150 A Jumper bar base with right side wiring	40	QOU16150BARB OBS
6P jumper bar cover	40	QOU16150CAB OBS
Vertical rainproof cover 2P and 3P QO, QOU, FA and KA	1 10	BCV *[30]* BCVB OBS
Horizontal rainproof cover 2P QO, QOU, and 3P Q2, EH	1 10	BCH *[30]* BCHB *[30]*
1P Fingersafe™ cover for high ampere QOU circuit breaker	1 40	QOUHFSC1 QOUHFSC1B OBS
1P Fingersafe cover for low ampere QOU circuit breaker	1 40	QOULFSC1 QOULFSC1B
Cover plate for one 2P QOU circuit breaker	1 40	QOUCP2 OBS QOUCP2B
Cover plate for one 3P QOU circuit breaker	1 40	QOUCP3 OBS QOUCP3B
Cover plate for two 2P QOU circuit breakers	1 40	QOUCP4 OBS QOUCP4B
Cover plate for three 2P QOU circuit breakers	1 40	QOUCP6 OBS QOUCP6B
Field-installable ring tongue terminal adaptor	1 80	QOURT QOURTB
Quick connector end connection wiring	1 40	QOUEC QOUECB
Quick connector forward or reverse wiring	1 40	QOUFR OBS QOUFRB
1P QOU mounting foot	1 80	QOUMF1*[30]* QOUMF1B *[30]*
2P QOU mounting foot	1 40	QOUMF2 *[30]* QOUMF2B *[30]*
3P QOU mounting foot	1 24	QOUMF3 OBS QOUMF3B *[30]*
Tapped mounting foot for QOU, 1P and 2P 10–70 A, 3P 10–60 A		
Packaged with circuit breaker		Suffix -3100
Individually packaged	1	QOUMFS1
Bulk packed	80	QOUMFS1B OBS
Mechanical interlock attachment: Used to interlock two circuit breakers mounted side-by-side so that only one circuit breaker can be ON at a time. A 1P or 2P circuit breaker can be mounted on the left and interlocked with a 2P or 3P circuit breaker on the right.	1	QOU2DTILA *[31]*

OBS This product is obsolete.

QOUQ Low Ampere Circuit Breakers

QOUQ low ampere circuit breakers with four-point quick-connect terminals are provided with permanent factory-installed terminals which are affixed to the Load or OFF end of the circuit breaker. This special terminal will accommodate up to four 1/4-inch insulated female quick connect wire terminations. Total ampacity of these connections must not exceed the rating of the circuit breaker.

Table 7.27: QOUQ Four-Point Quick-Connect Terminals

	Poles	Order Qty.	Cat. No.
Four-Point Quick-Connect Terminals	1	1	Change QOU to QOUQ
	2	1	
	3	1	

The QOU uses the same electrical accessories as the QO. See the QO information for available electrical accessories.

[30] For use on low and high ampere QOU.
[31] 10–70 A 1P and 2P, 10–60 A 3P.

HOM 1P
1 Space Required

HOM 2P
2 Spaces Required

HOM2200BB
Branch Circuit Breaker
4 Spaces Required

Homeline Standard Plug-On Circuit Breakers

The Square D Homeline circuit breakers are in a 1 in. wide format for 1-pole circuit breakers. They are designed to plug into Homeline load centers.

Table 7.28: Standard HOM Plug-on Circuit Breakers

Ampere Rating	AIR	1P—120 Vac, 1 Space Required	2P—120/240 Vac Common Trip 2 Spaces Required.
15 A	10 kA	HOM115 *[1][2]*	HOM215 *[2]*
20 A	10 kA	HOM120 *[1][2]*	HOM220 *[2]*
25 A	10 kA	HOM125 *[2]*	HOM225 *[2]*
30 A	10 kA	HOM130 *[2]*	HOM230 *[2]*
35 A	10 kA	—	HOM235 *[2]*
40 A	10 kA	HOM140 *[2]*	HOM240 *[2]*
45 A	10 kA	—	HOM245 *[2]*
50 A	10 kA	HOM150 *[2]*	HOM250 *[2]*
60 A	10 kA	—	HOM260 *[2]*
70 A	10 kA	—	HOM270 *[2]*
80 A	10 kA	—	HOM280 *[2]*
90 A	10 kA	—	HOM290 *[2]*
100 A	10 kA	—	HOM2100 *[2]*
110 A	10 kA	—	HOM2110 *[2]*
125 A	10 kA	—	HOM2125 *[2]*
150 A	10 kA	—	HOM2150BB *[2][3]*
175 A	10 kA	—	HOM2175BB *[2][3]*
200 A	10 kA	—	HOM2200BB *[2][3]*

Homeline High Magnetic Circuit Breakers (HOM-HM)

High magnetic trip circuit breakers are recommended for applications where high initial inrush current may occur.

Table 7.29: HOM-HM Circuit Breakers

Amperes	1P—120/240 Vac	2Ps
15 A	HOM115HM OBS	—
20 A	HOM120HM *[2]*	—

OBS This product is obsolete.

Homeline Combination Arc Fault Circuit Interrupters (HOM-CAFI)

Homeline Combination Arc Fault Circuit Interrupters—Provide overload and short circuit protection, plus arc fault protection in accordance with the NEC and UL1699.

HOM 1P CAFI
Plug-on Neutral

HOM 1P CAFI
Pigtail

Table 7.30: HOM-CAFI Circuit Breakers

Circuit Breaker Type	Ampere Rating	Poles 120 Vac	Cat. No.
One-Pole			
Combination Arc-Fault Circuit Interrupter with Pigtail Neutral	15 A	1	HOM115CAFI *[2]*
	20 A	1	HOM120CAFI *[2]*
Plug-On Neutral Combination Arc-Fault Interrupter	15 A	1	HOM115PCAFI *[2]*
	20 A	1	HOM120PCAFI *[2]*
Two-Pole			
Combination Arc-Fault Circuit Interrupter with Pigtail Neutral	15 A	2	HOM215CAFI *[2] [4]*
	20 A	2	HOM220CAFI *[2] [4]*

Homeline Dual Function Circuit Breaker (HOM-DF)

Homeline Combination Arc Fault and Ground Fault Circuit Interrupters (Dual Function)—Provide overload and short circuit protection, plus arc fault and ground fault protection in a single device in accordance with the NEC, UL1699 and UL943.

HOM 1P DF
Plug-on Neutral

HOM 1P DF
Pigtail

Table 7.31: HOM-DF Circuit Breakers

Circuit Breaker Type	Ampere Rating	Poles 120 Vac	Cat. No.
Combination Arc-Fault and Ground Fault Circuit Interrupter with Pigtail Neutral	15 A	1	HOM115DF *[2]*
	20 A	1	HOM120DF *[2]*
Plug-On Neutral Combination Arc-Fault and Ground Fault Circuit Interrupter	15 A	1	HOM115PDF *[2]*
	20 A	1	HOM120PDF *[2]*

[1] UL Listed as SWD (switching duty) rated. Suitable for switching 120 Vac fluorescent lighting loads.
[2] UL Listed as HACR type for use with air conditioning, heating and refrigeration equipment haing motor group combinations and marked for use with HACR type circuit breakers.
[3] Requires four spaces (1 AWG–300 kcmil Al/Cu). Use only in 1Ø panel rated 150 A or greater.
[4] For 120/240 V only, not for 208Y/120 V.

HOM 1P GFI
(With Ground Fault Circuit Interrupter)
1 Space Required

HOM 2P GFI
(With Ground Fault Circuit Interrupter)
2 Spaces Required

Homeline Ground-Fault Circuit Breaker (HOM-GFI)

HOM-GFI circuit breakers provide overload and short circuit protection, combined with Class A ground fault protection. Class A denotes a ground fault circuit interrupter that will trip when a fault current to ground is 6 milliamperes or more.

Table 7.32: HOM-GFI Circuit Breakers

Circuit Breaker Type	Ampere Rating	AIR	1P—120 Vac 1 Space Required	2P—120/240 Vac Common Trip 2 Spaces Required
Ground-Fault Circuit Interrupter(Pigtail Neutral)	15 A	10 kA	HOM115GFI	HOM215GFI
	20 A	10 kA	HOM120GFI	HOM220GFI
	25 A	10 kA	—	HOM225GFI
	30 A	10 kA	—	HOM230GFI
	35 A	10 kA	—	HOM235GFI
	40 A	10 kA	—	HOM240GFI
	45 A	10 kA	—	HOM245GFI
	50 A	10 kA	—	HOM250GFI
Plug-On Neutral Ground-Fault Circuit Interrupter	15 A	10 kA	HOM115PGFI*[5]*	—
	20 A	10 kA	HOM120PGFI*[5]*	—

Homeline Equipment Protection Device (HOM-EPD)

Homeline Equipment Protection Device—Circuit Breakers with 30 mA Equipment Ground Fault Protection (UL Listed).

Table 7.33: HOM-EPD Circuit Breakers

Amperes	1P—120 Vac	2P—120/240 Vac Common Trip
15 A	HOM115EPD	HOM215EPD OBS
20 A	HOM120EPD	HOM220EPD
25 A	—	HOM225EPD
30 A	—	HOM230EPD
40 A	—	HOM240EPD
50 A	—	HOM250EPD

OBS This product is obsolete.

Homeline Tandem and Quad Tandem Circuit Breakers (HOMT)

Table 7.34: HOMT Tandem Circuit Breakers

Ampere Rating *[6]*	AIR	1P Tandem—120/240 Vac (One Space Required)
15 and 15 A	10 kA	HOMT1515 *[7]*
15 and 20 A	10 kA	HOMT1520 *[7]*
20 and 20 A	10 kA	HOMT2020 *[7]*
30 and 15 A	10 kA	HOMT3015 *[7]*
30 and 20 A	10 kA	HOMT3020 *[7]*

HOMT Quad
Circuit Breaker
2 Spaces Required

Table 7.35: HOMT Quad Tandem 1P Circuit Breakers

Ampere Rating *[6]*		AIR	2P Tandem—120/240 Vac (Two Spaces Required)
1P	2P		
(2) 15 A	15 A	10 kA	HOMT1515215
(2) 15 A	20 A	10 kA	HOMT1515220
(2) 15 A	25 A	10 kA	HOMT1515225 OBS
(2) 15 A	30 A	10 kA	HOMT1515230
(2) 15 A	40 A	10 kA	HOMT1515240
(2) 15 A	50 A	10 kA	HOMT1515250
(2) 20 A	20 A	10 kA	HOMT2020220
(2) 20 A	25 A	10 kA	HOMT2020225
(2) 20 A	30 A	10 kA	HOMT2020230
(2) 20 A	40 A	10 kA	HOMT2020240
(2) 20 A	50 A	10 kA	HOMT2020250

OBS This product is obsolete.

NOTE: Typical catalog no. (e.g. HOMT 1515230) represents two 1P, outer poles (two 15 A 1P CBs) and one 2P inner circuit breaker with common trip (one 30 A 2P CB).

Table 7.36: HOMT Quad Tandem 2P Circuit Breakers

Ampere Rating *[6]*		AIR	(2) 2P Tandem—120/240 Vac (Two Spaces Required)
2P	2P		
15 A	15 A	10 kA	HOMT215215
15 A	20 A	10 kA	HOMT215220
15 A	25 A	10 kA	HOMT215225
15 A	30 A	10 kA	HOMT215230
15 A	40 A	10 kA	HOMT215240
15 A	50 A	10 kA	HOMT215250
20 A	20 A	10 kA	HOMT220220
20 A	25 A	10 kA	HOMT220225
20 A	30 A	10 kA	HOMT220230
20 A	40 A	10 kA	HOMT220240
20 A	50 A	10 kA	HOMT220250
25 A	25A	10 kA	HOMT225225
25 A	30 A	10 kA	HOMT225230
25 A	40 A	10 kA	HOMT225240
25 A	50 A	10 kA	HOMT225250

[5] New Plug-on Neutral

[6] 15–20 A tandem or quad tandem circuit breakers are suitable for use with 60ºC or 75ºC conductors. 25–50 A tandem or quad tandem circuit breakers are suitable for use with 75ºC conductors only.

[7] UL Listed as HACR type for use with air conditioning, heating and refrigeration equipment haing motor group combinations and marked for use with HACR type circuit breakers.

Table 7.36 HOMT Quad Tandem 2P Circuit Breakers (cont'd.)

Ampere Rating *[8]*		AIR	(2) 2P Tandem—120/240 Vac (Two Spaces Required)
2P	2P		
30 A	30 A	10 kA	HOMT230230
30 A	40 A	10 kA	HOMT230240
30 A	50 A	10 kA	HOMT230250

NOTE: Typical catalog no. (i.e. HOMT215230) represents two 2P; outer poles (one 15 A 2P with common trip) and inner poles (one 30 A 2P with common trip).

Homeline Circuit Breaker Wire Sizes

Table 7.37: Wire Sizes for Homeline Circuit Breakers

Breaker Type	Ampere Rating	Wire Size (AWG/kcmil) *[9]*	
		Aluminum	Copper
HOM 1P	15–30 A	14–8 AWG	14–8 AWG or (2) 14–10 AWG
	40–50 A	8–2 AWG	8–2 AWG
HOM 2P	15–30 A	14–8 AWG	14–8 AWG or (2) 14–10 AWG
	35–70 A	8–2 AWG	8–2 AWG
	80–125 A	4–2/0 AWG	4–2/0 AWG
	150–200 A	4 AWG–300 kcmil	4 AWG–300 kcmil
HOMT and Quad	15–30 A	14–8 AWG	14–8 AWG
Quad Only	40–50 A	6–12 AWG	6–14 AWG
HOM-GFI - 1P	15–20 A	14–10 AWG	14–10 AWG
HOM-GFI - 2P	15–50 A	12–4 AWG	14–6 AWG

Accessories for Homeline Circuit Breakers

Table 7.38: Accessories for Use with Homeline Circuit Breakers

Description		Cat. No.
Handle Attachments		
Handle Tie: Converts any two adjacent 120/240 Vac single HOM circuit breakers to independent trip 2P		HOM1HT
Handle Tie: Converts any two adjacent 120/240 Vac 1P side-by-side HOMT circuit breakers to independent trip 2P		HOMTHT
Handle Clamp: Clamp for holding HOM 1P handle in the ON or OFF position		QO1LO
Handle Blocking Device: Attaches to standard HOM 2P circuit breakers for holding the handle in the OFF position		HOM2HBD
Handle Padlock Attachment: For padlocking 1P Standard HOM breakers in the ON or OFF position		HOM1PA
Handle Padlock Attachment: For padlocking 2P Standard HOM circuit breakers in ON or OFF position	15–70 A	HOM2PALA
	80–125 A	HOM2PAHA
	150–200 A	HOM2PAVHA
Handle Padlock Attachment: For padlocking 1P CAFI, DF, GFI, and EPD HOM breakers in ON or OFF position		HOMELEC1PA
Handle Padlock Attachment: For padlocking 2P CAFI, GFI, and EPD HOM breakers in ON or OFF position		HOMELEC2PALA
Handle Padlock Attachment: For padlocking center poles of Homeline Quad breakers in the OFF position		HOMQPA
Handle Padlock Attachment: For padlocking main circuit breakers in convertible load center in OFF position	50–125 A	QOM1PA *[10]*
	100–225 A	QOM2PA *[10]*
Sub-Feed Lugs		
125 A 2P plug-on—2 spaces required		HOML2125
225 A 2P plug-on—4 spaces required		HOML2225 *[11]*

[8] 15–20 A tandem or quad tandem circuit breakers are suitable for use with 60°C or 75°C conductors. 25–50 A tandem or quad tandem circuit breakers are suitable for use with 75°C conductors only.
[9] 15–30 A circuit breakers are suitable for use with 60°C or 75°C conductors. 40–125 A circuit breakers are suitable for use with 75°C conductors.
[10] 50–125 A QOM1 frame size; 100–225 A QOM2 frame size.
[11] Requires four spaces (1 AWG–300 kcmil Al/Cu). Use only in 1Ø panel rated 150 A or greater.

UL489 / CSA C22.2 No 5 / IEC/EN 60947-2 / GB14048-2
Miniature Circuit Breakers

Multi 9 C60BP and C60BPR Miniature Circuit Breakers

$C60_{BP}$ and $C60_{BPR}$ are multi-standard miniature circuit breakers and branch circuit protection as defined by UL489. They combine the following functions:

- circuit protection against short-circuit curves
- circuit protection against overload currents
- tripping and fault indication by the addition of auxiliary accessories

Number of 18 mm (0.71 in.) Poles	Rating (A) 25°C/77°F	Breaking Capacity (kA rms)							
		AIR UL 489 / CSA C22.2 No 5				Icu IEC 60947-2			
	Voltage (Ue)	277 Vac	240 Vac	120 Vac	60 Vdc	440 Vac	415 Vac	240 Vac	60 Vdc
1P	0.5 to 35	10	14	14	10	—	3	10	20
	40 to 63	—	10	10	10	—	3	10	20
	Voltage (Ue)	480Y/277 Vac		240 Vac	125 Vdc	440 Vac	415 Vac	240 Vac	125 Vdc
2P	1 to 25	10		14	10	6	10	20	—
	30 to 35	10		14	—	6	10	20	—
3P	1 to 35	10		14	—	6	10	20	—
2P/3P	40 to 63	—		10	—	6	10	20	—


$C60_{BP}$ 1P


$C60_{BP}$ 2P


$C60_{BP}$ 3P


$C60_{BPR}$ 1P


$C60_{BPR}$ 2P


$C60_{BPR}$ 3P

Table 7.39: C60BP and C60BPRCatalog Numbers

Type Rating (In)	UL489 and CSA Voltages	1P Curve Z	1P Curve C	1P Curve D (= K)	2P Curve C	2P Curve D (= K)	3P Curve C	3P Curve D (= K)
$C60_{BP}$ (Tunnel Terminal Connection)								
0.5	480Y/277 V and 240 V	M9F44170	M9F42170	M9F43170	—	—	—	—
1		M9F44101	M9F42101	M9F43101	M9F42201	M9F43201	M9F42301	M9F43301
2		M9F44102	M9F42102	M9F43102	M9F42202	M9F43202	M9F42302	M9F43302
3		M9F44103	M9F42103	M9F43103	M9F42203	M9F43203	M9F42303	M9F43303
4		M9F44104	M9F42104	M9F43104	M9F42204	M9F43204	M9F42304	M9F43304
5		M9F44105	M9F42105	M9F43105	M9F42205	M9F43205	M9F42305	M9F43305
6		M9F44106	M9F42106	M9F43106	M9F42206	M9F43206	M9F42306	M9F43306
8		M9F44108	M9F42108	M9F43108	M9F42208	M9F43208	M9F42308	M9F43308
10		M9F44110	M9F42110	M9F43110	M9F42210	M9F43210	M9F42310	M9F43310
15		M9F44115	M9F42115	M9F43115	M9F42215	M9F43215	M9F42315	M9F43315
20		M9F44120	M9F42120	M9F43120	M9F42220	M9F43220	M9F42320	M9F43320
25		M9F44125	M9F42125	M9F43125	M9F42225	M9F43225	M9F42325	M9F43325
30		M9F44130	M9F42130	M9F43130	M9F42230	M9F43230	M9F42330	M9F43330
35		M9F44135	M9F42135	M9F43135	M9F42235	M9F43235	M9F42335	M9F43335
40	240 V only	M9F44140	M9F42140	M9F43140	M9F42240	M9F43240	M9F42340	M9F43340
45		M9F44145	M9F42145	M9F43145	M9F42245	M9F43245	M9F43245	M9F43345
50		M9F44150	M9F42150	M9F43150	M9F42250	M9F43250	M9F42350	M9F43350
63		M9F44163	M9F42163	M9F43163	M9F42263	M9F43263	M9F42363	M9F43363
$C60_{BPR}$ (Ring Tongue Terminal Connection)								
1	480Y/277 V and 240 V	M9F54101	M9F52101	M9F53101	M9F52201	M9F53201	M9F52301	M9F53301
2		M9F54102	M9F52102	M9F53102	M9F52202	M9F53202	M9F52302	M9F53302
4		M9F54104	M9F52104	M9F53104	M9F52204	M9F53204	M9F52304	M9F53304
6		M9F54106	M9F52106	M9F53106	M9F52206	M9F53206	M9F52306	M9F53306
8		M9F54108	M9F52108	M9F53108	M9F52208	M9F53208	M9F52308	M9F53308
10		M9F54110	M9F52110	M9F53110	M9F52210	M9F53210	M9F52310	M9F53310
15		M9F54115	M9F52115	M9F53115	M9F52215	M9F53215	M9F52315	M9F53315
20		M9F54120	M9F52120	M9F53120	M9F52220	M9F53220	M9F52320	M9F53320
25		M9F54125	M9F52125	M9F53125	M9F52225	M9F53225	M9F52325	M9F53325
30		M9F54130	M9F52130	M9F53130	M9F52230	M9F53230	M9F52330	M9F53330
35		M9F54135	M9F52135	M9F53135	M9F52235	M9F53235	M9F52335	M9F53335
40	240 V only	M9F54140	M9F52140	M9F53140	M9F52240	M9F53240	M9F52340	M9F53340
45		M9F54145	M9F52145	M9F53145	M9F52245	M9F53245	M9F52345	M9F53345
50		M9F54150	M9F52150	M9F53150	M9F52250	M9F53250	M9F52350	M9F53350
63		M9F54163	M9F52163	M9F53163	M9F52263	M9F53263	M9F52363	M9F53363

UL1077 / CSA C22.2 No 235 / IEC/EN 60947-2 / GB14048-2
Multi 9 Miniature Circuit Breaker

Multi 9 C60SP Miniature Circuit Breakers

C60SP circuit breakers are multi-standard miniature circuit beakers and supplementary protection as defined by UL1077. They combine the following functions:

- circuit protection against short-circuit curves
- circuit protection against overload currents
- tripping and fault indication by the addition of auxiliary accessories

Number of 18 mm (0.71 in.) Poles	Rating (A) 25°C/77°F	Breaking capacity (kA rms)							
		AIR UL 489 / CSA C22.2 No 235				Icu IEC 60947-2			
	Voltage (Ue)	277 Vac	240 ac	120 Vac	65 Vdc	440 Vac	415 Vac	240 Vac	60 Vdc
1P	0.5 to 32	10	14	14	10	—	3	10	20
	40 to 63	5	10	10	10	—	3	10	20
	Voltage (Ue)	480Y/277 Vac		240 Vac	125 Vdc	440 Vac	415 Vac	240 Vac	125 Vdc
2P	1 to 25	10		14	10	6	10	20	—
	32	10		14	—	6	10	20	—
3P/4P	2 to 32	10		14	—	6	10	20	—
2P/3P /4P	40 to 63	5		10	—	6	10	20	—


C60SP 1P


C60SP 2P


C60SP 3P


C60SP 4P

Table 7.40: C60SP Catalog Numbers

Tunnel Terminal Connection						
Rating (In)	Curve			Curve		
	B	C	D (= K)	B	C	D (= K)
	1P			2P		
0.5	M9F21170	M9F22170	M9F23170	—	—	—
1	M9F21101	M9F22101	M9F23101	M9F21201	M9F22201	M9F23201
2	M9F21102	M9F22102	M9F23102	M9F21202	M9F22202	M9F23202
3	M9F21103	M9F22103	M9F23103	M9F21203	M9F22203	M9F23203
4	M9F21104	M9F22104	M9F23104	M9F21204	M9F22204	M9F23204
5	M9F21105	M9F22105	M9F23105	M9F21205	M9F22205	M9F23205
6	M9F21106	M9F22106	M9F23106	M9F21206	M9F22206	M9F23206
8	M9F21108	M9F22108	M9F23108	M9F21208	M9F22208	M9F23208
10	M9F21110	M9F22110	M9F23110	M9F21210	M9F22210	M9F23210
13	M9F21113	M9F22113	M9F23113	M9F21213	M9F22213	M9F23213
16	M9F21116	M9F22116	M9F23116	M9F21216	M9F22216	M9F23216
20	M9F21120	M9F22120	M9F23120	M9F21220	M9F22220	M9F23220
25	M9F21125	M9F22125	M9F23125	M9F21225	M9F22225	M9F23225
32	M9F21132	M9F22132	M9F23132	M9F21232	M9F22232	M9F23232
40	M9F21140	M9F22140	M9F23140	M9F21240	M9F22240	M9F23240
45	M9F21145	M9F22145	M9F23145	M9F21245	M9F22245	M9F23245
50	M9F21150	M9F22150	M9F23150	M9F21250	M9F22250	M9F23250
63	M9F21163	M9F22163	M9F23163	M9F21263	M9F22263	M9F23263
	3P			4P		
0.5	—	—	—	—	—	—
1	—	—	—	—	—	—
2	M9F21302	M9F22302	M9F23302	M9F21402	M9F22402	M9F23402
3	—	—	—	—	—	—
4	—	—	—	—	—	—
5	—	—	—	—	—	—
6	M9F21306	M9F22306	M9F23306	M9F21406	M9F22406	M9F23406
8	M9F21308	M9F22308	M9F23308	M9F21408	M9F22408	M9F23408
10	M9F21310	M9F22310	M9F23310	M9F21410	M9F22410	M9F23410
13	M9F21313	M9F22313	M9F23313	M9F21413	M9F22413	M9F23413
16	M9F21316	M9F22316	M9F23316	M9F21416	M9F22416	M9F23416
20	M9F21320	M9F22320	M9F23320	M9F21420	M9F22420	M9F23420
25	M9F21325	M9F22325	M9F23325	M9F21425	M9F22425	M9F23425
32	M9F21332	M9F22332	M9F23332	M9F21432	M9F22432	M9F23432
40	M9F21340	M9F22340	M9F23340	M9F21440	M9F22440	M9F23440
45	M9F21345	M9F22345	M9F23345	M9F21445	M9F22445	M9F23445
50	M9F21350	M9F22350	M9F23350	M9F21450	M9F22450	M9F23450
63	M9F21363	M9F22363	M9F23363	M9F21463	M9F22463	M9F23463

UL1077, IEC/EN 60947-2, GB14048.2
Multi 9 Miniature Circuit Breakers

Multi 9 C60H-DC Miniature Circuit Breakers for DC Circuits

C60H-DC circuit breakers are multi–standard miniature circuit beakers and supplementary protection as defined by UL1077, dedicated to direct current applications. They combine the following functions:

- circuit protection against short-circuit curves
- circuit protection against overload currents
- tripping and fault indication by the addition of auxiliary accessories

Number of 18 mm (0.71 in.) Poles	Rating (A) 25°C/77°F	Breaking capacity (kA rms)				
		AIR UL 1077SA C22.2 No 5	Icu IEC 60947-2			
Voltage (Ue)		12–250 Vdc	110 Vdc	220 Vdc	250 Vdc	
1P	0.5 to 63	5	20	10	6	
Voltage (Ue)		12–250 Vdc		220 Vdc	440 Vdc	500 Vdc
2	0.5 to 63	5	—	20	10	6


C60H-DC 1P


C60H-DC 2P

Table 7.41: C60H-DC Catalog Numbers

Rating (In)	Curve			Curve		
	B	C	K (= D)	B	C	K (= D)
	1P			2P		
0.5	—	M9U21170	—	—	M9U21270	—
1	—	M9U21101	M9U31101	—	M9U31201	M9U31201
2	—	M9U21102	M9U31102	—	M9U21202	M9U31202
3	—	M9U21103	M9U31103	—	M9U21203	M9U31203
4	—	M9U21104	M9U31104	—	M9U21204	M9U31204
6	M9U11106	M9U21106	M9U31106	M9U11206	M9U21206	M9U31206
10	M9U11110	M9U21110	M9U31110	M9U11210	M9U21210	M9U31210
13	M9U11113	M9U21113	M9U31113	M9U11213	M9U21213	M9U31213
16	M9U11116	M9U21116	M9U31116	M9U11216	M9U21216	M9U31216
20	M9U11120	M9U21120	M9U31120	M9U11220	M9U21220	M9U31220
25	M9U11125	M9U21125	M9U31125	M9U11225	M9U21225	M9U31225
32	M9U11132	M9U21132	M9U31132	M9U11232	M9U21232	M9U31232
40	M9U11140	M9U21140	M9U31140	M9U11240	M9U21240	M9U31240
50	M9U11150	M9U21150	M9U31150	M9U11250	M9U21250	M9U31250
63	M9U11163	M9U21163	M9U31163	M9U11263	M9U21263	M9U31263

UL1053, IEC/EN 61008
Multi 9 Ground Fault Protectors

Multi 9 GFP Ground Fault Protectors

UL 1053 residual current circuit breakers already protected upstream by a short circuit and overload protection device are used for:

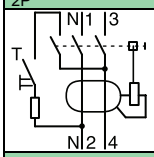
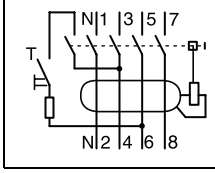
- control and disconnection of electric circuits
- protection of people against electric shock by direct and indirect contacts
- protection of installations against insulation faults
- enhanced continuity of supply, during a series of close lightning strokes, IT earthing system, equipment including interference suppression filters, variable speed controllers, frequency converters, electronic ballasts for lighting
- enhanced earth leakage protection: in presence of harmonics or high frequency ejections.

A-SI type GFPs are ideal for operation in environments with a humid atmosphere and/or polluted by aggressive agents: swimming pools, marinas, agri-food industries, water treatment stations, industrial sites, etc.


Multi 9 GFP 2P


Multi 9 GFP 4P

Table 7.42: GFP UL 1053 Type A-SI

A-S1 Type	Rating (A)	Sensitivity (mA)		Catalog No		Width in modules of 9 mm (0.354 in.)
		UL 1053	IEC/ EN 61008	120 or 240 V 230 or 240 V	240 V 480Y/277 V 230/400 or 240/415 V	
2P						
	25	26	30	M9R81225	M9R41225	4
		86	100	M9R12225	M9R44225	
		260	300	M9R84225	—	
	40	26	30	M9R81240	M9R41240	
		260	300	M9R84240	—	
	63	26	30	M9R81263	—	
4P						
	25	26	30	—	M9R81425	8
		86	100	—	M9R12425	
		260	300	—	M9R84425	
	40	26	30	—	M9R81440	
		260	300	—	M9R84440	
	63	26	30	—	M9R81463	
		86	100	—	M9R12463	
	100	86	100	—	M9R12491	
		260	300	—	M9R84491	

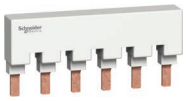
$C60_{BP}$ (UL489) Comb Busbars

These comb busbars are aimed to be used only with $C60_{BP}$ circuit-breakers.

They perform distribution and subdistribution of the electric power supply and allow rapid assembly and disassembly of equipment.

IEC

Table 7.43: $C60_{BP}$ Comb Busbars

Connection Accessories	Comb Busbars						Insulated Connectors	Tooth Covers	End-Piece
Function									
	• The comb busbars make it easier to install $C60_{BP}$ UL489 circuit breakers. • They must not be cut.						• Comb busbar power supply • Vertical incoming feeder	• Insulation of teeth remaining free	• Ensures the correct comb busbar insulation
Use									
	Power supply by insulated connector • Use with rigid and flexible copper cable • 6 to 35 mm² (AWG #10 to #2):						Tightening torque: 3.5 N•m (31 lb.in.)		
Standard Comb Busbars									
									
Number of poles	1P			2P		3P		All	All	—
Catalogue numbers	M9XUP106	M9XUP312		M9XUP312	M9XUP312	M9XUP312	M9R81425	M9XUPC04	M9XCTC18	—
Number of 18 mm modules	6	12		6	12	6	12	—	—	—
Set of	1			1		1		4	5 x 3	—
Cuttable Comb Busbars									
									
Number of poles x	1P	2P	3P	1P+Aux		3P+Aux		All	All	—
Catalogue numbers	M9XCP157	M9XCP256	M9XCP357	M9XCA137		M9XCA348		M9XCPC04	M9XUTC18	M9XCEC10
Number of 18 mm modules	57	56	57	37		37		—	—	—
Set of	1	1	1	1		1		4	5 x 3	—
Technical Specifications										
Acceptable current at 40°C (Ie)	Standard comb busbars: 115 A Cuttable comb busbars: 80 A									
Resistance to short-circuit currents	Compatible with the breaking capacity of Schneider Electric modular circuit breakers									
Voltage rating (Ue)	480Y/277 V									
Insulation voltage (Ui)	1000 V AC									
Pollution degree	3									
Fire resistance	Self-extinguishability 960°C 30 s/30 s									
Colour	RAL 7035									
Standards	UL508									

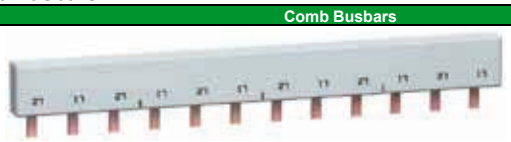
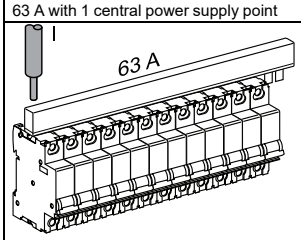
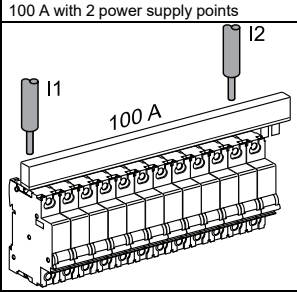
C60SP (UL1077) Comb Busbars

The comb busbars are used only for C60SP circuit breakers UL 1077 supplementary protection in conformity with standards:

- UL 1077 / CSA C22.2 No. 235 / IEC 60947-2 / GB 14048-2.

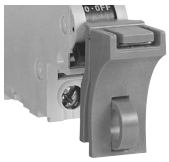
They perform distribution and subdistribution of the electric power supply and allow rapid assembly and disassembly of equipment.

Table 7.44: C60SP Comb Busbars

Connection Accessories	Comb Busbars			Tooth Cover End-Piece
				
Function				
	• The comb busbars make it easier to install Schneider Electric circuit breakers UL1077 supplementary protection. • Power supply directly in the cage of the circuit breaker.			• The Tooth Caps are insulated protectors which may be slipped onto the unused teeth of the comb busbar. • They come in strips with 1-pole spacing, but can be snapped apart to be used individually.
Number of poles	1P	2P	3P	All
Voltage rating (Ue)	480Y/277 Vac	480Y/277 Vac	480Y/277 Vac	—
Catalogue numbers	10285	10286	10287	60488
Number of 18 mm modules	12 (8.5 in./216 mm)	12 (8.5 in./216 mm)	12 (8.5 i./216 mm)	—
Set of	1	1	1	20
Technical Specifications				
Insulation voltage (Ui)	690 Vac			—
Impulse withstand voltage (Uimp)	12 kV under 240 V 5 kV under 480Y/277 V or 277 V			—
Acceptable current at 40°C (Ie)	63 A with 1 central power supply point	100 A with 2 power supply points		—
				—
	Power supply via cable directly in the cage of the device: • cross section max: 3 AWG (25 mm²) • cross section min: 10 AWG (5.27 mm²)			—

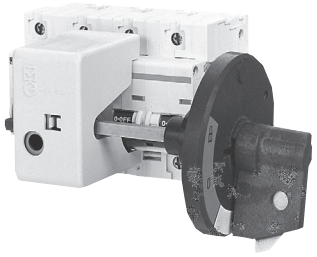
Ring Tongue Terminal Kit

Spacer



C60 Padlock Attachment

Heavy-Duty Padlock Attachment

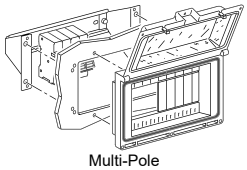


Rotary Handle

Front Mounting Kit for C60
1P, 2P, 3P, 4P
(1 per circuit breaker)

MGN26380 Locking Device Left Side Mount

MGN26380 Locking Device Right Side Mount



Multi-Pole Front Mounting Kit

Multi 9 C60 Accessories

Electrical Accessories for C60 Circuit Breakers and Supplementary Protectors

Possible Combinations
Mounted to the left of the circuit breaker with a maximum width of 54 mm.

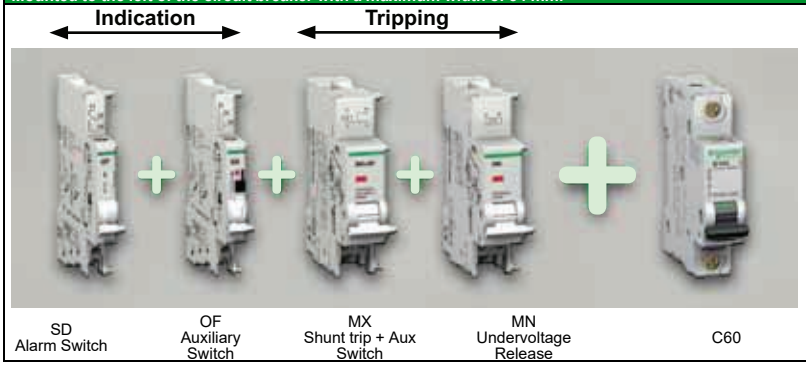


Table 7.45: Multi 9 C60 Electrical Accessories

Descriptions	Control Voltage		Width in 9 mm Modules	C60 UL/IEC Cat. No.
	Vac	Vdc		
OF Auxiliary Switch (1a1b)	12–277	12–125	1	M9A26924
SD Alarm Switch (1a1b)	12–277	12–125	1	M9A26927
MX Shunt Trip + OF Auxiliary Switch (1a1b)	24	24	2	M9A26948
	48	48	2	M9A26947
	110–240–277	125	2	M9A26946
MN Undervoltage Release	24	24	2	M9A27108
	48	48	2	M9A26961
	120	—	2	M9A27107
	240	—	2	M9A26960
Multi-9 GFP UL 1053 Listed Ground Fault Protectors	120 to 480Y/277 Vac; 30, 100, and 300 mA; 2P and 4Ps. See Multi 9 GFP Ground Fault Protectors, page 7-27 or Catalog LVCATM9OEM_EN			

Table 7.46: Multi 9 C60 Mechanical Accessories

Descriptions		C60 Cat. No.
Ring tongue terminal kit for UL1077 C60	For one pole	M9A17400
Spacer for DIN rail, Not UL Recognized	9 mm wide	27062
Padlock Attachment (1 per for 1P, 2P, 3P or 4P)	2 per pack	26970
Heavy-duty Padlock Attachment for C60, Locks OFF only	2 per pack	M9PAF
Padlocking Device Left Side Mount, Locks OFF only *[1]*	1 per pack	MGN26380
Padlocking Device Right Side Mount, Locks OFF only *[2]*		MGN26381
Front Mounting Kit	1P	MG26983
	2P	MG26984
	3P	MG26985
	4P	MG26989
Terminal Screw Shield (Not UL Recognized)	Bag of two 4P shields	26981
Terminal cover (Not UL Recognized)	1P	26975
	2P	26976
	3P	26975 + 26976
	4P	26978
Rotary Handle for C60 (Non UL Recognized)		
Operating Subassembly	2P/3P/4P	27046
Door Interlock Handle		27047
Fixed Handle (Front or Lateral)		27048
Multi-pole Front Mounting Kit		
Rail Support (20 of 9 mm modules)		14211
Hinged Transparent Cover		14210

[1] Left-side mounted padlocking device cannot be used in conjunction with accessories SD, OF, MX or MN. Use right-side mounted padlocking device when accessories are required.
[2] Right-side mounted padlocking device cannot be used in conjunction with VIGI module. Use left-side mounted padlocking device when VIGI Module is required.

The PowerPacT Advantage

- **Proven Performance:** Industry-leading circuit breaker innovation and protection for heavy-duty commercial and industrial applications.
- **Smart**: Integrated metering options provide a cost-effective solution to reduce energy consumption, optimize energy costs, and improve energy availablility for your facilities.
- **Flexible:** Full range of thermal-magnetic and electronic trip molded case circuit breakers from 15 to 3000 A, delivering the ratings, configurations, and operators for your unique applications.
- **Simple:** Common catalog numbers, standardized ratings, and a full range of field-installable accessories make product selection, installation and maintenance easier than ever.
- **Common Design Features:** Mounting holes, door trim, and handle accessories

B-Frame 125 A	H-Frame 150 A	J-Frame 250 A	Q-Frame 250 A	L-Frame 600 A	M-Frame 800 A	P-Frame 1200 A	R-Frame 3000 A
	 Electronic Trip Version	 Electronic Trip Version					

Table 7.47: PowerPacT Interrupting Ratings

Voltage	Interrupting Rating						
	B	D	G	J	K	L	R
240 Vac	10 kA	25 kA	65 kA	100 kA	65 kA *[1]*	125 kA	200 kA
480 Vac	—	18 kA	35 kA	65 kA	65 kA *[2]*	100 kA	200 kA
600 Vac	—	14 kA	18 kA	25 kA	65 kA *[2]*	50 kA *[3]*	100 kA

Table 7.48: Common Catalog Numbering System

Frame	Rating	Termination	Poles	Voltage	Amperage*[4]*			Suffix Code		Suffix Code	
H	G	L	3	6	1	5	0	A	B	S	A

1=1Pole
2=2Pole
3=3Pole
4=4Pole

4=480 V
6=600 V

2A/2B Auxiliary Switch

110 Vac Shunt Trip

Frame Designation

B	125 A Frame
H	150 A Frame
J	250 A Frame
Q	250 A Frame
L	600 A Frame
M	800 A Frame
P	1200 A Frame
R	3000 A Frame

Interrupting Rating

	240 Vac	480 Vac	600Vac
B	10 kA	—	—
D	25 kA	18 kA	14 kA
G	65 kA	35 kA	18 kA
J	100 kA	65 kA	25 kA
K	100 kA	65 kA	65 kA
L	125 kA	100 kA	50 kA
R	200 kA	200 kA	100 kA

Terminations

A	I-Line
L	Lugs on Both Ends
F	Bus Bar (No Lugs)
M	Lugs Line Side Only
P	Lugs Load End Only
N	Plug-in
D	Drawout
S	Rear Connected Studs

For more information:

B-Frame Circuit Breakers, page 7-32
H- and J-Frame Circuit Breakers, page 7-33
Q-Frame Circuit Breakers, page 7-36
L-Frame Circuit Breakers, page 7-38
P-Frame Circuit Breakers , page 7-41
R-Frame Circuit Breakers, page 7-42
H, J, and L-Frame Motor Protectors, page 7-50
Motor Circuit Protectors and Motor Protector Circuit Breakers , page 7-50
Automatic Switches, page 7-46
500 Vdc Circuit Breakers, page 7-45
Mission Critical Circuit Breakers, page 7-44
Electrical Accessories for Circuit Breakers, page 7-51
Motor Operators, page 7-52 and Rotary Handles, page 7-53
Locks, Installation Accessories, and Rear Connectors, page 7-54
Mechanical Lugs, page 7-56
Compression Lugs, page 7-57 and Power Distribution Connectors, page 7-58
Terminal Nuts, Terminal Pads, Terminal Shields, and Accessories, page 7-59
Plug-In and Drawout Mountings, page 7-60
MicroLogic Electronic Trip Units, page 7-61
Trip Unit Accessories, page 7-64

[1] B-frame K interrupting rating is 100 kA at 240 Vac
[2] P-frame K interrupting is 50 kA at 480 and 600 Vac.
[3] P-frame L interrupting is 25 kA at 600 Vac.
[4] For amperage of M,-, P- or R-frame circuit breakers, add a zero to the three amperage digits; for example, 120 = 1200 A.

PowerPacT B-Frame Molded Case Circuit Breakers (125 A)

PowerPacT B-frame circuit breakers provides economical thermal-magnetic circuit protection in a compact size.

- Fixed 15-125 A thermal-magnetic protection up to 600Y/347 Vac and 250 Vdc
- 1- to 4-pole unit mount construction; 1- to 3-pole I-Line construction
- UL listed interrupting ratings from 18 kA to 65 kA at 480 Vac
- EverLink lugs, a cable connection method that helps maintain low resistance connections
- UL, CSA, NOM, IEC, CCC certified and CE marked for global acceptance

B-Frame
Thermal-Magnetic Trip Unit

With EverLink Lug Technology

Table 7.49: PowerPacT B-Frame 125 A Thermal-Magnetic Circuit Breakers (600Y/347 Vac) with EverLink Lugs

Current Rating @ 40° C	Interrupting Rating													
	D				G				J				K	
	1 Pole 347 Vac 125 Vdc	2 Pole 600Y/347 Vac 250 Vdc	3 Pole 600Y/347 Vac 250 Vdc	4 Pole 600Y/347 Vac 250 Vdc	1 Pole 347 Vac 125 Vdc	2 Pole 600Y/347 Vac 250 Vdc	3 Pole 600Y/347 Vac 250 Vdc	4 Pole 600Y/347 Vac 250 Vdc	1 Pole 347 Vac 125 Vdc	2 Pole 600Y/347 Vac 250 Vdc	3 Pole 600Y/347 Vac 250 Vdc	4 Pole 600Y/347 Vac 250 Vdc	1 Pole 347 Vac	2 Pole 600Y/347 Vac
15 A	BDL16015	BDL26015	BDL36015	BDL46015	BGL16015	BGL26015	BGL36015	BGL46015	BJL16015	BJL26015	BJL36015	BJL46015	BKL16015	BKL26015
20 A	BDL16020	BDL26020	BDL36020	BDL46020	BGL16020	BGL26020	BGL36020	BGL46020	BJL16020	BJL26020	BJL36020	BJL46020	BKL16020	BKL26020
25 A	BDL16025	BDL26025	BDL36025	BDL46025	BGL16025	BGL26025	BGL36025	BGL46025	BJL16025	BJL26025	BJL36025	BJL46025	BKL16025	BKL26025
30 A	BDL16030	BDL26030	BDL36030	BDL46030	BGL16030	BGL26030	BGL36030	BGL46030	BJL16030	BJL26030	BJL36030	BJL46030	BKL16030	BKL26030
35 A	BDL16035	BDL26035	BDL36035	BDL46035	BGL16035	BGL26035	BGL36035	BGL46035	BJL16035	BJL26035	BJL36035	BJL46035	—	—
40 A	BDL16040	BDL26040	BDL36040	BDL46040	BGL16040	BGL26040	BGL36040	BGL46040	BJL16040	BJL26040	BJL36040	BJL46040	—	—
45 A	BDL16045	BDL16045	BDL36045	BDL46045	BGL16045	BGL26045	BGL36045	BGL46045	BJL16045	BJL26045	BJL36045	BJL46045	—	—
50 A	BDL16050	BDL26050	BDL36050	BDL46050	BGL16050	BGL26050	BGL36050	BGL46050	BJL16050	BJL26050	BJL36050	BJL46050	—	—
60 A	BDL16060	BDL26060	BDL36060	BDL46060	BGL16060	BGL26060	BGL36060	BGL46060	BJL16060	BJL26060	BJL36060	BJL46060	—	—
70 A	BDL16070	BDL26070	BDL36070	BDL46070	BGL16070	BGL26070	BGL36070	BGL46070	BJL16070	BJL26070	BJL36070	BJL46070	—	—
80 A	BDL16080	BDL26080	BDL36080	BDL46080	BGL16080	BGL26080	BGL36080	BGL46080	BJL16080	BJL26080	BJL36080	BJL46080	—	—
90 A	BDL16090	BDL26090	BDL36090	BDL46090	BGL16090	BGL26090	BGL36090	BGL46090	BJL16090	BJL26090	BJL36090	BJL46090	—	—
100 A	BDL16100	BDL26100	BDL36100	BDL46100	BGL16100	BGL26100	BGL36100	BGL46100	BJL16100	BJL26100	BJL36100	BJL46100	—	—
110 A	BDL16110	BDL26110	BDL36110	BDL46110	BGL16110	BGL26110	BGL36110	BGL46110	BJL16110	BJL26110	BJL36110	BJL46110	—	—
125 A	BDL16125	BDL26125	BDL36125	BDL46125	BGL16125	BGL26125	BGL36125	BGL46125	BJL16125	BJL26125	BJL36125	BJL46125	—	—

Table 7.50: B-Frame Termination Options

Termination Letter and Description		Example
A	I-Line (See Section 9, Panelboards)	B D **L** 3 6 1 0 0 For factory-installed termination, place termination letter in the **third** block of the circuit breaker catalog number. In this example "L" indicates EverLink Lugs for both ON and OFF ends.
F	No Lugs (includes terminal nut kit on both ends)	
L	ON end: EverLink Lugs OFF end: EverLink Lugs	
M	ON end: EverLink Lugs OFF end: Terminal Nut Kit	
P	ON end: Terminal Nut Kit OFF end: EverLink Lugs	

Table 7.52: B-Frame Lug Options

Lug Option Suffix	
No Suffix = EverLink Lugs both ends	B D **L** 3 6 1 0 0 **LU** For factory-installed lug option, place suffix after the amperage in the circuit breaker catalog number.
LU = EverLink Lug with Control Wire Terminal ON end; EverLink Lug OFF end	
LV = EverLink Lug ON end; EverLink Lug with Control Wire Terminal OFF end	
LW = EverLink Lug with Control Wire Terminal both ends	
LC = Copper Mechanical Lugs both ends	
LH = Aluminum Mechanical Lugs both ends	

Table 7.51: B-Frame Interrupting Ratings

Voltage	Interrupting Rating			
	D	G	J	K
240 Vac	25 kA	65 kA	100 kA	100 kA
480Y/277 Vac	18 kA	35 kA	65 kA	65 kA
480 Vac	18 kA	35 kA	65 kA	65 kA
600Y/347 Vac	14 kA	18 kA	25 kA	65 kA
125 Vdc	10 kA	20 kA	50 kA	—
250 Vdc	10 kA	20 kA	50 kA	—

Table 7.53: PowerPacT B-Frame 125 A Magnetic Trip Values

Current Rating @ 40° C	Fixed AC Magnetic Trip	
	Hold	Trip
15 A	400 A	600 A
20 A	400 A	600 A
25 A	480 A	720 A
30 A	480 A	720 A
35 A	480 A	720 A
40 A	480 A	720 A
45 A	480 A	720 A
50 A	480 A	720 A
60 A	640 A	960 A
70 A	800 A	1200 A
80 A	800 A	1200 A
90 A	1000 A	1500 A
100 A	1000 A	1500 A
110 A	1000 A	1500 A
125 A	1000 A	1500 A

Accessories see page 7-51
Optional Lugs see page 7-56
Dimensions see page 7-83

J-Frame
MicroLogic™ Trip Unit

J-Frame 3–Pole
Thermal-Magnetic Trip Unit

Table 7.54: Lug Kit Wire Ranges

Sensor Rating	Standard Lug Kit	Terminal Wire Range
60–150 A	AL150HD	14–3/0 AWG Al or Cu
250 A	AL250JD.	3/0 AWG–350 kcmil Al or Cu

PowerPacT H- and J-Frame Molded-Case Circuit Breakers (150 A and 250 A)

A flexible, high performance offer certified to global standards.

- Thermal magnetic or MicroLogic™ trip protection from 15–250 A up to 600 Vac and 250 Vdc
- 2 and 3-pole unit mount and I-Line constructions*[5]*
- High performance UL listed interrupting ratings from 18 to 200 kA at 480 Vac
- H- and J-Frame have common mounting holes, handle locations and trim dimensions with many shared accessories and auxiliaries.
- UL, CSA, NOM, IEC, CCC certified and CE marked for global acceptance.

Table 7.55: H- and J-Frame Interrupting Ratings

Voltage	Interrupting Rating				
	D	G	J	L	R
240 Vac	25 kA	65 kA	100 kA	125 kA	200 kA
480 Vac	18 kA	35 kA	65 kA	100 kA	200 kA
600 Vac	14 kA	18 kA	25 kA	50 kA	100 kA
250 Vdc*[6]*	20 kA	20 kA	20 kA	20 kA	—

Table 7.56: H- and J-Frame Termination Options

Termination Letter	
A - I-Line (See Section 9—Panelboards)	H D **L** 3 6 0 1 5 For factory-installed termination, place termination letter in the third block of the circuit breaker catalog number.
F = No Lugs (includes terminal nut kit on both ends)	
L = Lugs both ends	
M = Lugs ON end Terminal Nut Kit OFF end	
P = Lugs OFF end Terminal Nut Kit ON end	
N = Plug-in	
D = Drawout	
S = Rear Connected	

Accessories see page 7-51
Optional Lugs see page 7-56
Dimensions see page 7-83
Enclosures see page 7-84

[5] H- and J- frame circuit breakers can be used as a main or sub-feed circuit breaker in an NQ or NF panelboard.
[6] Not available with electronic trip units.

PowerPacT H-Frame Thermal-Magnetic Circuit Breakers

Table 7.57: PowerPacT H-Frame 150 A Thermal-Magnetic UL Current-Limiting *[7]* Circuit Breakers (600 Vac, 250 Vdc) *[8]* With Factory Sealed Trip Unit Suitable for Reverse Connection *[9]*

Current Rating @ 40° C	Fixed AC Magnetic Trip		Interrupting Rating							
			D		G		J *[8]*		L *[8]*	
	Hold	Trip	Standard (80% Rated)	100% Rated	Standard (80% Rated)	100% Rated	Standard (80% Rated)	100% Rated	Standard (80% Rated)	100% Rated
H-Frame, 150A 2P, 600 Vac 50/60 Hz, 250 Vdc *[10]*										
15 A	350 A	750 A	HDL26015	HDL26015C	HGL26015	HGL26015C	HJL26015	HJL26015C	HLL26015	HLL26015C
20 A	350 A	750 A	HDL26020	HDL26020C	HGL26020	HGL26020C	HJL26020	HJL26020C	HLL26020	HLL26020C
25 A	350 A	750 A	HDL26025	HDL26025C	HGL26025	HGL26025C	HJL26025	HJL26025C	HLL26025	HLL26025C
30 A	350 A	750 A	HDL26030	HDL26030C	HGL26030	HGL26030C	HJL26030	HJL26030C	HLL26030	HLL26030C
35 A	400 A	850 A	HDL26035	HDL26035C	HGL26035	HGL26035C	HJL26035	HJL26035C	HLL26035	HLL26035C
40 A	400 A	850 A	HDL26040	HDL26040C	HGL26040	HGL26040C	HJL26040	HJL26040C	HLL26040	HLL26040C
45 A	400 A	850 A	HDL26045	HDL26045C	HGL26045	HGL26045C	HJL26045	HJL26045C	HLL26045	HLL26045C
50 A	400 A	850 A	HDL26050	HDL26050C	HGL26050	HGL26050C	HJL26050	HJL26050C	HLL26050	HLL26050C
60 A	800 A	1450 A	HDL26060	HDL26060C	HGL26060	HGL26060C	HJL26060	HJL26060C	HLL26060	HLL26060C
70 A	800 A	1450 A	HDL26070	HDL26070C	HGL26070	HGL26070C	HJL26070	HJL26070C	HLL26070	HLL26070C
80 A	800 A	1450 A	HDL26080	HDL26080C	HGL26080	HGL26080C	HJL26080	HJL26080C	HLL26080	HLL26080C
90 A	800 A	1450 A	HDL26090	HDL26090C	HGL26090	HGL26090C	HJL26090	HJL26090C	HLL26090	HLL26090C
100 A	800 A	1700 A	HDL26100	HDL26100C	HGL26100	HGL26100C	HJL26100	HJL26100C	HLL26100	HLL26100C
110 A	900 A	1700 A	HDL26110	HDL26110C	HGL26110	HGL26110C	HJL26110	HJL26110C	HLL26110	HLL26110C
125 A	900 A	1700 A	HDL26125	HDL26125C	HGL26125	HGL26125C	HJL26125	HJL26125C	HLL26125	HLL26125C
150 A	900 A	1700 A	HDL26150	HDL26150C	HGL26150	HGL26150C	HJL26150	HJL26150C	HLL26150	HLL26150C
H-Frame 150A 3P, 600 Vac 50/60 Hz, 250 Vdc										
15 A	350 A	750 A	HDL36015	HDL36015C	HGL36015	HGL36015C	HJL36015	HJL36015C	HLL36015	HLL36015C
20 A	350 A	750 A	HDL36020	HDL36020C	HGL36020	HGL36020C	HJL36020	HJL36020C	HLL36020	HLL36020C
25 A	350 A	750 A	HDL36025	HDL36025C	HGL36025	HGL36025C	HJL36025	HJL36025C	HLL36025	HLL36025C
30 A	350 A	750 A	HDL36030	HDL36030C	HGL36030	HGL36030C	HJL36030	HJL36030C	HLL36030	HLL36030C
35 A	400 A	850 A	HDL36035	HDL36035C	HGL36035	HGL36035C	HJL36035	HJL36035C	HLL36035	HLL36035C
40 A	400 A	850 A	HDL36040	HDL36040C	HGL36040	HGL36040C	HJL36040	HJL36040C	HLL36040	HLL36040C
45 A	400 A	850 A	HDL36045	HDL36045C	HGL36045	HGL36045C	HJL36045	HJL36045C	HLL36045	HLL36045C
50 A	400 A	850 A	HDL36050	HDL36050C	HGL36050	HGL36050C	HJL36050	HJL36050C	HLL36050	HLL36050C
60 A	800 A	1450 A	HDL36060	HDL36060C	HGL36060	HGL36060C	HJL36060	HJL36060C	HLL36060	HLL36060C
70 A	800 A	1450 A	HDL36070	HDL36070C	HGL36070	HGL36070C	HJL36070	HJL36070C	HLL36070	HLL36070C
80 A	800 A	1450 A	HDL36080	HDL36080C	HGL36080	HGL36080C	HJL36080	HJL36080C	HLL36080	HLL36080C
90 A	800 A	1450 A	HDL36090	HDL36090C	HGL36090	HGL36090C	HJL36090	HJL36090C	HLL36090	HLL36090C
100 A	800 A	1700 A	HDL36100	HDL36100C	HGL36100	HGL36100C	HJL36100	HJL36100C	HLL36100	HLL36100C
110 A	900 A	1700 A	HDL36110	HDL36110C	HGL36110	HGL36110C	HJL36110	HJL36110C	HLL36110	HLL36110C
125 A	900 A	1700 A	HDL36125	HDL36125C	HGL36125	HGL36125C	HJL36125	HJL36125C	HLL36125	HLL36125C
150 A	900 A	1700 A	HDL36150	HDL36150C	HGL36150	HGL36150C	HJL36150	HJL36150C	HLL36150	HLL36150C

HJ and HL are UL certified as current limiting circuit breakers.

PowerPacT J-Frame Thermal-Magnetic Circuit Breakers

Table 7.58: J-Frame 250 A Thermal-Magnetic UL Current-Limiting *[11]*Circuit Breakers (600 Vac, 250 Vdc) With Factory Sealed Trip Unit Suitable for Reverse Connection *[9]*

Current Rating @ 40°C	Adjustable AC Magnetic Trip		Interrupting Rating									
			D		G		J *[11]*		L *[11]*		R *[11]*	
	Low	High	Standard (80% Rated)	100% Rated	Standard (80% Rated)	100% Rated	Standard (80% Rated)	100% Rated	Standard (80% Rated)	100% Rated	Standard (80% Rated)	100% Rated
J-Frame 250 A 2P, 600 Vac 50/60 Hz, 250 Vdc*[12]*												
150 A	750 A	1500 A	JDL26150	JDL26150C	JGL26150	JGL26150C	JJL26150	JJL26150C	JLL26150	JLL26150C	—	—
175 A	875 A	1750 A	JDL26175	JDL26175C	JGL26175	JGL26175C	JJL26175	JJL26175C	JLL26175	JLL26175C	—	—
200 A	1000 A	2000 A	JDL26200	JDL26200C	JGL26200	JGL26200C	JJL26200	JJL26200C	JLL26200	JLL26200C	—	—
225 A	1125 A	2250 A	JDL26225	JDL26225C	JGL26225	JGL26225C	JJL26225	JJL26225C	JLL26225	JLL26225C	—	—
250 A	1250 A	2500 A	JDL26250	JDL26250C	JGL26250	JGL26250C	JJL26250	JJL26250C	JLL26250	JLL26250C	—	—
J-Frame 250 A 3P, 600 Vac 50/60 Hz, 250 Vdc												
150 A	750 A	1500 A	JDL36150	JDL36150C	JGL36150	JGL36150C	JJL36150	JJL36150C	JLL36150	JLL36150C	JRL36150	JRL36150C
175 A	875 A	1750 A	JDL36175	JDL36175C	JGL36175	JGL36175C	JJL36175	JJL36175C	JLL36175	JLL36175C	JRL36175	JRL36175C
200 A	1000 A	2000 A	JDL36200	JDL36200C	JGL36200	JGL36200C	JJL36200	JJL36200C	JLL36200	JLL36200C	JRL36200	JRL36200C
225 A	1125 A	2250 A	JDL36225	JDL36225C	JGL36225	JGL36225C	JJL36225	JJL36225C	JLL36225	JLL36225C	JRL36225	JRL36225C
250 A	1250 A	2500 A	JDL36250	JDL36250C	JGL36250	JGL36250C	JJL36250	JJL36250C	JLL36250	JLL36250C	JRL36250	JRL36250C

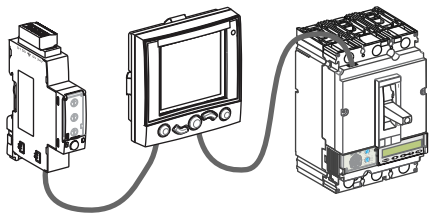
JJ, JL and JR are UL certified as current limiting circuit breakers.

[7] Circuit breakers with J and L interrupting ratings are UL certified as current limiting.
[8] Standard lug kit: AL150HD. Terminal wire range: 14–3/0 AWG Al or Cu.
[9] See Supplemental Digest Section 3 for circuit breakers with field interchangeable trip units.
[10] HD and HG circuit breakers are true two-pole construction.
[11] Circuit breakers with J, L, and R interrupting ratings are UL certified as current limiting.
[12] 2P in a 3P module

PowerPacT H- and J-Frame Electronic Trip Current Limiting Circuit Breakers (150 A and 250 A)

H-Frame
MicroLogic™ Trip Unit

J-Frame
MicroLogic Trip Unit



H-Frame Circuit Breaker
Optional FDM and IFM Module

Table 7.59: H-Frame 150 A and J-Frame 250 A Electronic Trip UL Current-Limiting *[13]* Standard (80% Rated) Circuit Breakers (600 Vac) With Factory Sealed Trip Unit *[14]* Suitable for Reverse Connection *[15]*

Electronic Trip Unit			Sensor Rating	Interrupting Rating (80% Rated)				
Type	Function	Trip Unit		D	G	J *[13]*	L *[13]*	R *[13]*
600 Vac, 50/60 Hz, 3P								
MicroLogic Standard	LI	3.2 *[16]*	60 A	HDL36060U31X	HGL36060U31X	HJL36060U31X	HLL36060U31X	HRL36060U31X
			100 A	HDL36100U31X	HGL36100U31X	HJL36100U31X	HLL36100U31X	HRL36100U31X
			150 A	HDL36150U31X	HGL36150U31X	HJL36150U31X	HLL36150U31X	HRL36150U31X
			250 A	JDL36250U31X	JGL36250U31X	JJL36250U31X	JLL36250U31X	JRL36250U31X
MicroLogic Standard	LSI	3.2S *[16]* *[17]*	60 A	HDL36060U33X	HGL36060U33X	HJL36060U33X	HLL36060U33X	HRL36060U33X
			100 A	HDL36100U33X	HGL36100U33X	HJL36100U33X	HLL36100U33X	HRL36100U33X
			150 A	HDL36150U33X	HGL36150U33X	HJL36150U33X	HLL36150U33X	HRL36150U33X
			250 A	JDL36250U33X	JGL36250U33X	JJL36250U33X	JLL36250U33X	JRL36250U33X
MicroLogic Ammeter	LSI	5.2A	60 A	HDL36060U43X	HGL36060U43X	HJL36060U43X	HLL36060U43X	HRL36060U43X
			100 A	HDL36100U43X	HGL36100U43X	HJL36100U43X	HLL36100U43X	HRL36100U43X
			150 A	HDL36150U43X	HGL36150U43X	HJL36150U43X	HLL36150U43X	HRL36150U43X
			250 A	JDL36250U43X	JGL36250U43X	JJL36250U43X	JLL36250U43X	JRL36250U43X
MicroLogic Energy	LSI	5.2E	60 A	HDL36060U53X	HGL36060U53X	HJL36060U53X	HLL36060U53X	HRL36060U53X
			100 A	HDL36100U53X	HGL36100U53X	HJL36100U53X	HLL36100U53X	HRL36100U53X
			150 A	HDL36150U53X	HGL36150U53X	HJL36150U53X	HLL36150U53X	HRL36150U53X
			250 A	JDL36250U53X	JGL36250U53X	JJL36250U53X	JLL36250U53X	JRL36250U53X
MicroLogic Ammeter	LSIG	6.2A *[18]*	60 A	HDL36060U44X	HGL36060U44X	HJL36060U44X	HLL36060U44X	HRL36060U44X
			100 A	HDL36100U44X	HGL36100U44X	HJL36100U44X	HLL36100U44X	HRL36100U44X
			150 A	HDL36150U44X	HGL36150U44X	HJL36150U44X	HLL36150U44X	HRL36150U44X
			250 A	JDL36250U44X	JGL36250U44X	JJL36250U44X	JLL36250U44X	JRL36250U44X
MicroLogic Energy	LSIG	6.2E	60 A	HDL36060U54X	HGL36060U54X	HJL36060U54X	HLL36060U54X	HRL36060U54X
			100 A	HDL36100U54X	HGL36100U54X	HJL36100U54X	HLL36100U54X	HRL36100U54X
			150 A	HDL36150U54X	HGL36150U54X	HJL36150U54X	HLL36150U54X	HRL36150U54X
			250 A	JDL36250U54X	JGL36250U54X	JJL36250U54X	JLL36250U54X	JRL36250U54X

Table 7.60: H-Frame 150 A and J-Frame 250 A Electronic Trip UL Current-Limiting *[13]* 100% Rated Circuit Breakers (600 Vac) With Factory Sealed Trip Unit *[14]* Suitable for Reverse Connection *[15]*

Electronic Trip Unit			Sensor Rating	Interrupting Rating (100% Rated)				
Type	Function	Trip Unit		D	G	J *[13]*	L *[13]*	R *[13]*
600 Vac, 50/60 Hz, 3P*[19]*								
MicroLogic Standard	LI	3.2 *[16]*	60 A	HDL36060CU31X	HGL36060CU31X	HJL36060CU31X	HLL36060CU31X	HRL36060CU31X
			100 A	HDL36100CU31X	HGL36100CU31X	HJL36100CU31X	HLL36100CU31X	HRL36100CU31X
			150 A	HDL36150CU31X	HGL36150CU31X	HJL36150CU31X	HLL36150CU31X	HRL36150CU31X
			250 A	JDL36250CU31X	JGL36250CU31X	JJL36250CU31X	JLL36250CU31X	JRL36250CU31X
MicroLogic Standard	LSI	3.2S *[16]* *[17]*	60 A	HDL36060CU33X	HGL36060CU33X	HJL36060CU33X	HLL36060CU33X	HRL36060CU33X
			100 A	HDL36100CU33X	HGL36100CU33X	HJL36100CU33X	HLL36100CU33X	HRL36100CU33X
			150 A	HDL36150CU33X	HGL36150CU33X	HJL36150CU33X	HLL36150CU33X	HRL36150CU33X
			250 A	JDL36250CU33X	JGL36250CU33X	JJL36250CU33X	JLL36250CU33X	JRL36250CU33X
MicroLogic Ammeter	LSI	5.2A	60 A	HDL36060CU43X	HGL36060CU43X	HJL36060CU43X	HLL36060CU43X	HRL36060CU43X
			100 A	HDL36100CU43X	HGL36100CU43X	HJL36100CU43X	HLL36100CU43X	HRL36100CU43X
			150 A	HDL36150CU43X	HGL36150CU43X	HJL36150CU43X	HLL36150CU43X	HRL36150CU43X
			250 A	JDL36250CU43X	JGL36250CU43X	JJL36250CU43X	JLL36250CU43X	JRL36250CU43X
MicroLogic Energy	LSI	5.2E	60 A	HDL36060CU53X	HGL36060CU53X	HJL36060CU53X	HLL36060CU53X	HRL36060CU53X
			100 A	HDL36100CU53X	HGL36100CU53X	HJL36100CU53X	HLL36100CU53X	HRL36100CU53X
			150 A	HDL36150CU53X	HGL36150CU53X	HJL36150CU53X	HLL36150CU53X	HRL36150CU53X
			250 A	JDL36250CU53X	JGL36250CU53X	JJL36250CU53X	JLL36250CU53X	JRL36250CU53X
MicroLogic Ammeter	LSIG	6.2A *[18]*	60 A	HDL36060CU44X	HGL36060CU44X	HJL36060CU44X	HLL36060CU44X	HRL36060CU44X
			100 A	HDL36100CU44X	HGL36100CU44X	HJL36100CU44X	HLL36100CU44X	HRL36100CU44X
			150 A	HDL36150CU44X	HGL36150CU44X	HJL36150CU44X	HLL36150CU44X	HRL36150CU44X
			250 A	JDL36250CU44X	JGL36250CU44X	JJL36250CU44X	JLL36250CU44X	JRL36250CU44X
MicroLogic Energy	LSIG	6.2E	60 A	HDL36060CU54X	HGL36060CU54X	HJL36060CU54X	HLL36060CU54X	HRL36060CU54X
			100 A	HDL36100CU54X	HGL36100CU54X	HJL36100CU54X	HLL36100CU54X	HRL36100CU54X
			150 A	HDL36150CU54X	HGL36150CU54X	HJL36150CU54X	HLL36150CU54X	HRL36150CU54X
			250 A	JDL36250CU54X	JGL36250CU54X	JJL36250CU54X	JLL36250CU54X	JRL36250CU54X

Accessories see page 7-51
Optional Lugs see page 7-56
Dimensions see page 7-83
Enclosures see page 7-84

[13] Circuit breakers with J, L, and R interrupting ratings are UL certified as current limiting.
[14] See Supplemental Digest Section 3 for circuit breakers with field interchangeable trip units.
[15] For applications requiring communications see page 7-64.
[16] 3P circuit breakers with this trip unit can be used for 2P applications.
[17] Fixed ST and LT delays.
[18] 3P circuit breakers with this trip unit can be used for 2P applications requiring ground fault protection. Additional metering capabilities will not work properly on the unconnected phase.
[19] 3-pole PowerPacT H- and J-frame circuit breakers can be used for 2-pole applications. (For such instances, MicroLogic 6.2 Ammeter and Energy trip units can be used for ground fault protection. Additional metering capabilities are not guaranteed when using MicroLogic Ammeter and Energy trip units for this type of application.

2–Pole Q-Frame with Thermal-Magnetic Trip Unit 70–250

3–Pole Q-Frame with Thermal-Magnetic Trip Unit 70–250 A

Q-Frame Molded Case Circuit Breakers (250 A)

PowerPacT Q-frame circuit breakers are used for overcurrent protection and switching on 240 Vac applications.*[20]*

- Fixed thermal magnetic protection from 70–250 A at 240 Vac
- 2- and 3-pole unit mount and I-Line constructions*[21]*
- UL listed interruption ratings from 10 kA to 100 kA at 240 Vac
- Available in standard (80%) rating only
- UL 489 Listed, CSA, NOM and IEC certified

Table 7.61: PowerPacT Q-Frame 250 A Thermal-Magnetic Circuit Breaker (240 Vac)

Ampere Rating	Fixed AC Magnetic Trip		Interrupting Rating				Terminal Wire Range
	Hold	Trip	B	D	G	J	
2P, 240 Vac							
70 A	1000 A	1800 A	QBL22070	QDL22070	QGL22070	QJL22070	#4 AWG - 300 kcmil Al/Cu
80 A	1000 A	1800 A	QBL22080	QDL22080	QGL22080	QJL22080	
90 A	1000 A	1800 A	QBL22090	QDL22090	QGL22090	QJL22090	
100 A	1200 A	2400 A	QBL22100	QDL22100	QGL22100	QJL22100	
110 A	1200 A	2400 A	QBL22110	QDL22110	QGL22110	QJL22110	
125 A	1200 A	2400 A	QBL22125	QDL22125	QGL22125	QJL22125	
150 A	1200 A	2400 A	QBL22150	QDL22150	QGL22150	QJL22150	
175 A	1200 A	2400 A	QBL22175	QDL22175	QGL22175	QJL22175	
200 A	1200 A	2400 A	QBL22200	QDL22200	QGL22200	QJL22200	
225 A	1200 A	2400 A	QBL22225	QDL22225	QGL22225	QJL22225	
250 A *[22]*	1200 A	2400 A	QBL22250	QDL22250	QGL22250	QJL22250	
3P, 240 Vac							
70 A	1000 A	1800 A	QBL32070	QDL32070	QGL32070	QJL32070	#4 AWG - 300 kcmil Al/Cu
80 A	1000 A	1800 A	QBL32080	QDL32080	QGL32080	QJL32080	
90 A	1000 A	1800 A	QBL32090	QDL32090	QGL32090	QJL32090	
100 A	1200 A	2400 A	QBL32100	QDL32100	QGL32100	QJL32100	
110 A	1200 A	2400 A	QBL32110	QDL32110	QGL32110	QJL32110	
125 A	1200 A	2400 A	QBL32125	QDL32125	QGL32125	QJL32125	
150 A	1200 A	2400 A	QBL32150	QDL32150	QGL32150	QJL32150	
175 A	1200 A	2400 A	QBL32175	QDL32175	QGL32175	QJL32175	
200 A	1200 A	2400 A	QBL32200	QDL32200	QGL32200	QJL32200	
225 A	1200 A	2400 A	QBL32225	QDL32225	QGL32225	QJL32225	
250 A *[23]*	1200 A	2400 A	QBL32250	QDL32250	QGL32250	QJL32250	

Table 7.62: Q-Frame Interrupting Ratings

Voltage	Interrupting Rating			
	B	D	G	J
240 Vac	10 kA	25 kA	65 kA	100 kA *[24]*

Table 7.63: Q-Frame Termination Options

Termination Letter	
A = I-Line (See Section 9—Panelboards)	Q G **L** 3 2 2 0 0 For factory-installed termination, place termination letter in the third block of the circuit breaker catalog number.
E = Bolt-on I-Line (See Section 9)	
F = No lugs	
L = Lugs both ends	
M = Lugs ON end, studs on OFF end	
P = Lugs OFF end, studs on ON end	

Dimension see page 7-83
Enclosures see page 7-84

[20] Replacement lugs and electrical accessories are not available for PowerPacT Q-frame circuit breakers.
[21] Q- frame can be used as main or sub-feed circuit breaker in a NQ panelboard.
[22] 250 A lugs are suitable for copper conductors only.
[23] 250 A circuit breakers are suitable for copper conductors only.
[24] 3P QJ circuit breakers are rated at 208Y/120 Vac only.

Q4-Frame Molded Case Circuit Breaker (400 A)

Q4L
2P and 3P
250–400 A

- Thermal magnetic protection from 250 A up to 400 A at 240 Vac
- 2- and 3-pole unit mount and I-Line constructions
- 25 kA at 240 Vac UL interrupting rating
- UL, CSA and IEC certified

NOTE: Consider using PowerPacT™ circuit breakers for situations requiring circuit breaker accessories. See PowerPacT Accessories, page 7-51 for more information.

Table 7.64: Q4-Frame, 400 A, Thermal-Magnetic Circuit Breakers, Individually-Mounted, 240 Vac

Ampere Rating	Adjustable AC Magnetic Trip *[25]*		Standard Interrupting Cat. No.	Terminal Wire Range
	Low	High		
2P, 240 Vac				
250	1250 A	2500 A	Q4L2250	AL400LA (1) 1 AWG–600 kcmil Al or (2) 1 AWG–250 kcmil Al
300	1500 A	3000 A	Q4L2300	
350	1750 A	3500 A	Q4L2350	
400	2000 A	4000 A	Q4L2400	
3P, 240 Vac				
250	1250 A	2500 A	Q4L3250	AL400LA (1) 1 AWG–600 kcmil Al or (2) 1 AWG–250 kcmil Al
300	1500 A	3000 A	Q4L3300	
350	1750 A	3500 A	Q4L3350	
400	2000 A	4000 A	Q4L3400	

Accessories see PowerPacT Accessories, page 7-51 through Plug-In and Drawout Mountings, page 7-60
Optional Lugs see Mechanical Lugs, page 7-56
Dimensions see Dimensions and Shipping Weights, page 7-82
Enclosures see Circuit Breaker Enclosures, page 7-84

LA/LH-Frame Molded Case Circuit Breaker (600 A)

LA/LHL
2P and 3P 125–400 A

- Thermal magnetic protection from 125-400 A up to 600 Vac and 250 Vdc
- 2- and 3-pole unit mount and I-Line constructions
- UL listed interrupting ratings from 30 kA to 35 kA at 480 Vac
- UL, CSA and IEC certified

NOTE: Consider using PowerPacT™ circuit breakers for situations requiring circuit breaker accessories. See PowerPacT Accessories, page 7-51 for more information.

Table 7.65: L-Frame, 600 A, Thermal-Magnetic, Individually-Mounted Circuit Breakers, 600 Vac

Ampere Rating	Adjustable AC Magnetic Trip		Cat. No.		Terminal Wire Range
	Low	High	Standard Interrupting	High Interrupting	
2P, 600 Vac, 250 Vdc					
125 A	625 A	1250 A	LAL26125	LHL26125	AL400LA (1) 1 AWG–600 kcmil Al or (2) 1 AWG–250 kcmil Al
150 A	750 A	1500 A	LAL26150	LHL26150	
175 A	875 A	1750 A	LAL26175	LHL26175	
200 A	1000 A	2000 A	LAL26200	LHL26200	
225 A	1125 A	2250 A	LAL26225	LHL26225	
250 A	1250 A	2500 A	LAL26250	LHL26250	
300 A	1500 A	3000 A	LAL26300	LHL26300	
350 A	1750 A	3500 A	LAL26350	LHL26350	
400 A	2000 A	4000 A	LAL26400	LHL26400	
3P, 600 Vac, 250 Vdc					
125 A	625 A	1250 A	LAL36125	LHL36125	AL400LA (1) 1 AWG–600 kcmil Al or (2) 1 AWG–250 kcmil Al
150 A	750 A	1500 A	LAL36150	LHL36150	
175 A	875 A	1750 A	LAL36175	LHL36175	
200 A	1000 A	2000 A	LAL36200	LHL36200	
225 A	1125 A	2250 A	LAL36225	LHL36225	
250 A	1250 A	2500 A	LAL36250	LHL36250	
300 A	1500 A	3000 A	LAL36300	LHL36300	
350 A	1750 A	3500 A	LAL36350	LHL36350	
400 A	2000 A	4000 A	LAL36400	LHL36400	

Table 7.66: Interrupting Ratings

Voltage	LAL	LHL
240 Vac	42 kA	65 kA
480 Vac	30 kA	35 kA
600 Vac	22 kA	25 kA

Accessories see PowerPacT Accessories, page 7-51 through Plug-In and Drawout Mountings, page 7-60
Optional Lugs see Mechanical Lug Information, page , Supplemental Digest Section 3.
Dimensions see Dimensions and Shipping Weights, page 7-82
Enclosures see Circuit Breaker Enclosures, page 7-84

[25] UL magnetic trip setting tolerances are ±25% for low and ±20% for high from nominal value shown.

PowerPacT L-Frame Molded Case Circuit Breakers (600 A)

A flexible, high performance offer certified to global standards.

- Basic Electronic and MicroLogic trip protection from 250–600 Vac
- 2-, 3- and 4-pole design; wide range of trip units to protect most applications
- High performance UL listed interrupting ratings from 35 kA to 200 kA at 480 Vac
- Standard (80%) or 100% rating
- UL, CSA, NOM, IEC, CCC certified and CE marked for global acceptance

PowerPacT L-Frame with MicroLogic™ Trip Unit

Table 7.67: PowerPacT L-Frame 600 A, (80% Rated) UL Current-Limiting *[26]* Circuit Breakers (600 Vac) with Lugs and Factory-Sealed Electronic Trip Units Suitable for Reverse Connection *[27]*

Electronic Trip Unit		Ampere Rating	Instantaneous Adjustment		Interrupting	J Interrupting
Type	Protection		Low	High	Cat. No.	Cat. No.
2P, 600 Vac 50/60 Hz						
NOTE: Availability to be announced						
Basic	Electronic with Fixed Long-time, Adjustable Instantaneous Trip	250	1.5x	12x	LGL26250	LJL26250
		300	1.5x	12x	LGL26300	LJL26300
		350	1.5x	12x	LGL26350	LJL26350
		400	1.5x	12x	LGL26400	LJL26400
		500	1.5x	11x	LGL26500	LJL26500
		600	1.5x	11x	LGL26600	LJL26600
3P, 600 Vac 50/60 Hz						
NOTE: Availability to be announced						
Basic	Electronic with Fixed Long-time, Adjustable Instantaneous Trip	250	1.5x	12x	LGL36250	LJL36250
		300	1.5x	12x	LGL36300	LJL36300
		350	1.5x	12x	LGL36350	LJL36350
		400	1.5x	12x	LGL36400	LJL36400
		500	1.5x	11x	LGL36500	LJL36500
		600	1.5x	11x	LGL36600	LJL36600

Table 7.68: L-Frame 600 A Standard (80% Rated) UL Current-Limiting *[26]* Circuit Breakers (600 Vac) with Lugs and Factory-Sealed Electronic Trip Units Suitable for Reverse Connection *[28][27]*

Electronic Trip Unit			Sensor Rating	Interrupting Rating (80% Rated)				
Type	Function	Trip Unit		G	J *[26]*	L *[26]*	R *[26]*	Terminal
600 Vac, 50/60 Hz, 3P								
MicroLogic Standard	LI	3.3 *[29]*	250 A	LGL36250U31X	LJL36250U31X	LLL36250U31X	LRL36250U31X	AL400L61K3 *[30]*
			400 A	LGL36400U31X	LJL36400U31X	LLL36400U31X	LRL36400U31X	AL600LS52K3
			600 A	LGL36600U31X	LJL36600U31X	LLL36600U31X	LRL36600U31X	
MicroLogic Standard	LSI	3.3S *[29]* *[31]*	250 A	LGL36250U33X	LJL36250U33X	LLL36250U33X	LRL36250U33X	AL400L61K3 *[32]*
			400 A	LGL36400U33X	LJL36400U33X	LLL36400U33X	LRL36400U33X	AL600LS52K3
			600 A	LGL36600U33X	LJL36600U33X	LLL36600U33X	LRL36600U33X	
MicroLogic Ammeter	LSI	5.3A	400 A	LGL36400U43X	LJL36400U43X	LLL36400U43X	LRL36400U43X	AL600LS52K3
			600 A	LGL36600U43X	LJL36600U43X	LLL36600U43X	LRL36600U43X	
MicroLogic Energy	LSI	5.3E	400 A	LGL36400U53X	LJL36400U53X	LLL36400U53X	LRL36400U53X	
			600 A	LGL36600U53X	LJL36600U53X	LLL36600U53X	LRL36600U53X	
MicroLogic Ammeter	LSIG	6.3A	400 A	LGL36400U44X	LJL36400U44X	LLL36400U44X	LRL36400U44X	
			600 A	LGL36600U44X	LJL36600U44X	LLL36600U44X	LRL36600U44X	
MicroLogic Energy	LSIG	6.3E *[33]*	400 A	LGL36400U54X	LJL36400U54X	LLL36400U54X	LRL36400U54X	
			600 A	LGL36600U54X	LJL36600U54X	LLL36600U54X	LRL36600U54X	
600 Vac, 50/60 Hz, 4P								
MicroLogic Standard	LI	3.3	250 A	LGL46250U31X	LJL46250U31X	LLL46250U31X	LRL46250U31X	AL400L61K4
			400 A	LGL46400U31X	LJL46400U31X	LLL46400U31X	LRL46400U31X	AL600LS52K4
			600 A	LGL46600U31X	LJL46600U31X	LLL46600U31X	LRL46600U31X	
MicroLogic Standard	LSI	3.3S*[31]*	250 A	LGL46250U33X	LJL46250U33X	LLL46250U33X	LRL46250U33X	AL400L61K4
			400 A	LGL46400U33X	LJL46400U33X	LLL46400U33X	LRL46400U33X	AL600LS52K4
			600 A	LGL46600U33X	LJL46600U33X	LLL46600U33X	LRL46600U33X	
MicroLogic Ammeter	LSI	5.3A	400 A	LGL46400U43X	LJL46400U43X	LLL46400U43X	LRL46400U43X	AL600LS52K4
			600 A	LGL46600U43X	LJL46600U43X	LLL46600U43X	LRL46600U43X	
MicroLogic Energy	LSI	5.3E	400 A	LGL46400U53X	LJL46400U53X	LLL46400U53X	LRL46400U53X	
			600 A	LGL46600U53X	LJL46600U53X	LLL46600U53X	LRL46600U53X	
MicroLogic Ammeter	LSIG	6.3A	400 A	LGL46400U44X	LJL46400U44X	LLL46400U44X	LRL46400U44X	
			600 A	LGL46600U44X	LJL46600U44X	LLL46600U44X	LRL46600U44X	
MicroLogic Energy	LSIG	6.3E	400 A	LGL46400U54X	LJL46400U54X	LLL46400U54X	LRL46400U54X	
			600 A	LGL46600U54X	LJL46600U54X	LLL46600U54X	LRL46600U54X	

[26] Circuit breakers with J, L, and R interrupting ratings are UL certified as current limiting.
[27] For applications requiring communications see page 7-64.
[28] See Supplemental Digest Section 3 for circuit breakers with field interchangeable trip units.
[29] 3P circuit breakers with this trip unit can be used for 2P applications.
[30] AL600LS52K3 terminal wire range is (2) 2/0 AWG 500 kcmil Al/Cu
[31] Fixed ST and LT delays.
[32] AL400L61K3 terminal wire ranges are (1) 2 AWG–600 kcmil Cu or 1) 2 AWG–500 kcmil Al.
[33] 3-pole circuit breakers can be used for 2-pole applications. (For such instances, MicroLogic 6.2 Ammeter and Energy trip units can be used for ground fault protection. Additional metering capabilities are not guaranteed when using MicroLogic Ammeter and Energy trip units for this type of application.)

Table 7.69: L-Frame 600 A 100% Rated UL Current-Limiting *[34]* Circuit Breakers with Lugs and Factory-Sealed Electronic Trip Units Suitable for Reverse Connection *[35][36]*

Electronic Trip Unit			Sensor Rating	Interrupting Rating (100% Rated)					Terminal
Type	Function	Trip Unit		D	G	J *[34]*	L *[34]*	R *[34]*	
600 Vac, 50/60 Hz, 3P									
MicroLogic Standard	LI	3.3 *[37]*	250 A	LDL36250CU31X	LGL36250CU31X	LJL36250CU31X	LLL36250CU31X	LRL36250CU31X	AL400L61K3
			400 A	LDL36400CU31X	LGL36400CU31X	LJL36400CU31X	LLL36400CU31X	LRL36400CU31X	AL600LS52K3
MicroLogic Standard	LSI	3.3S *[37]* *[38]*	250 A	LDL36250CU33X	LGL36250CU33X	LJL36250CU33X	LLL36250CU33X	LRL36250CU33X	AL400L61K3
			400 A	LDL36400CU33X	LGL36400CU33X	LJL36400CU33X	LLL36400CU33X	LRL36400CU33X	AL600LS52K3
MicroLogic Ammeter	LSI	5.3A	400 A	LDL36400CU43X	LGL36400CU43X	LJL36400CU43X	LLL36400CU43X	LRL36400CU43X	AL600LS52K3
MicroLogic Energy	LSI	5.3E	400 A	LDL36400CU53X	LGL36400CU53X	LJL36400CU53X	LLL36400CU53X	LRL36400CU53X	
MicroLogic Ammeter	LSIG	6.3A	400 A	LDL36400CU44X	LGL36400CU44X	LJL36400CU44X	LLL36400CU44X	LRL36400CU44X	
MicroLogic Energy	LSIG	6.3E *[39]*	400 A	LDL36400CU54X	LGL36400CU54X	LJL36400CU54X	LLL36400CU54X	LRL36400CU54X	
600 Vac, 50/60 Hz, 4P									
MicroLogic Standard	LI	3.3	250 A	LDL46250CU31X	LGL46250CU31X	LJL46250CU31X	LLL46250CU31X	LRL46250CU31X	AL400L61K4
			400 A	LDL46400CU31X	LGL46400CU31X	LJL46400CU31X	LLL46400CU31X	LRL46400CU31X	AL600LS52K4
MicroLogic Standard	LSI	3.3S	250 A	LDL46250CU33X	LGL46250CU33X	LJL46250CU33X	LLL46250CU33X	LRL46250CU33X	AL400L61K4
			400 A	LDL46400CU33X	LGL46400CU33X	LJL46400CU33X	LLL46400CU33X	LRL46400CU33X	AL600LS52K4
MicroLogic Ammeter	LSI	5.3A	400 A	LDL46400CU43X	LGL46400CU43X	LJL46400CU43X	LLL46400CU43X	LRL46400CU43X	AL600LS52K4
MicroLogic Energy	LSI	5.3E	400 A	LDL46400CU53X	LGL46400CU53X	LJL46400CU53X	LLL46400CU53X	LRL46400CU53X	
MicroLogic Ammeter	LSIG	6.3A	400 A	LDL46400CU44X	LGL46400CU44X	LJL46400CU44X	LLL46400CU44X	LRL46400CU44X	
MicroLogic Energy	LSIG	6.3E	400 A	LDL46400CU54X	LGL46400CU54X	LJL46400CU54X	LLL46400CU54X	LRL46400CU54X	

Table 7.70: PowerPacT L-Frame Terminal Wire Ranges

Terminal	Wire Range
AL400L61K3	(1) 2 AWG–600 kcmil Cu or 1) 2 AWG–500 kcmil Al.
AL600LS52K3	(2) 2/0 AWG–500 kcmil Al/Cu.

Table 7.71: PowerPacT L-FrameTermination Options

Termination Letter	Termination Option	
A	I-Line (See Section 9—Panelboards)	For factory-installed termination, place termination letter in the third block of the circuit breaker catalog number. Termination Letter L G L 3 6 6 0 0 U 4 4 X
F	No lugs	
L	Lugs both ends	
M	Lugs ON end, terminal nut kit OFF end	
P	Lugs OFF end, terminal nut kit ON end	
N	Plug In	
D	Drawout	
S	Rear Connected	

Table 7.72: PowerPacT L-Frame Interrupting Ratings

Voltage	Interrupting Rating				
	D	G	J	L	R
240 Vac	25 kA	65 kA	100 kA	125 kA	200 kA
480 Vac	18 kA	35 kA	65 kA	100 kA	200 kA
600 Vac	14 kA	18 kA	25 kA	50 kA	100 kA

Accessories see page 7-51
Optional Lugs see page 7-56
Dimensions see page 7-83
Enclosures see page 7-84

[34] Circuit breakers with J, L, and R interrupting ratings are UL certified as current limiting.
[35] See Supplemental Digest Section 3 for circuit breakers with field interchangeable trip units.
[36] For applications requiring communications see page 7-64.
[37] 3P circuit breakers with this trip unit can be used for 2P applications.
[38] Fixed ST and LT delays.
[39] 3-pole circuit breakers can be used for 2-pole applications. (For such instances, MicroLogic 6.2 Ammeter and Energy trip units can be used for ground fault protection. Additional metering capabilities are not guaranteed when using MicroLogic Ammeter and Energy trip units for this type of application.)

PowerPacT M-Frame Circuit Breaker with Basic Electronic Trip Unit

PowerPacT M-Frame Molded Case Circuit Breakers (800 A)

PowerPacT M-frame circuit breakers use an electronic trip system with the simplicity of a thermal magnetic breaker.

- Basic electronic trip protection from 300 to 800 A up to 600 Vac
- 2- and 3-pole unit mount and I-line construction
- UL listed interrupting ratings from 35 to 65 kA at 480 Vac
- Common mounting holes, handle locations and trim dimensions with shared auxiliaries and accessories with P-frame devices
- Available in standard (80%) rating only
- UL, CSA, NOM, CCC and IEC certified and CE marked for global acceptance

Table 7.73: M-Frame 800 A, Basic Electronic Trip System Type ET 1.0 *[40]* **Factory-Sealed Trip Unit**

Electronic Trip Unit		Ampere Rating	Adjustable Instantaneous Trip Range		Interrupting Rating	
Type	Function		Low	High	G	J
2P, 600 Vac 50/60 Hz						
Basic	Fixed Long-time, Adjustable Instantaneous Trip	400 A	800	4000	MGL26400	MJL26400
		600 A	1200	6000	MGL26800*[41]*	MJL26800*[41]*
3P, 600 Vac 50/60 Hz						
Basic	Fixed Long-time, Adjustable Instantaneous Trip	400 A	800	4000	MGL36400	MJL36400
		600 A	1200	6000	MGL36800*[41]*	MJL36800*[41]*

Table 7.74: M-Frame 800 A, Adjustable Amperage Electronic Trip Unit

Electronic Trip Unit		Adjustable Long-Time Settings	Adjustable Instantaneous		Interrupting Rating	
Type	Function		Low	High	G	J
2P, 600 Vac 50/60 Hz						
Basic	Adjustable Long-Time Adjustable Instantaneous Trip	300–800	2x	10x	MGL26800E10	MJL26800E10
3P, 600 Vac 50/60 Hz						
Basic	Adjustable Long-Time Adjustable Instantaneous Trip	300–800	2x	10x	MGL36800E10	MJL36800E10

Table 7.75: M-Frame Termination Options

Termination Letter	Termination Option
A	I-Line (See Section 9—Panelboards)
F	No lugs
L	Lugs both ends
M	Lugs ON end, terminal nut kit OFF end
P	Lugs OFF end, terminal nut kit ON end
M G **L** 3 6 4 0 0 For factory-installed termination, place termination letter in the third block of the circuit breaker catalog number.	

Table 7.76: PowerPacT M-Frame Interrupting Ratings

Voltage	Interrupting Rating	
	G	J
240 Vac	65 kA	100 kA
480 Vac	35 kA	65 kA
600 Vac	18 kA	25 kA

Accessories see page 7-51
Optional Lugs see page 7-56
Dimensions see page 7-83
Enclosures see page 7-84

[40] The ET 1.0 trip unit cannot be field replaced or have the long-time trip point setting adjusted. It is considered an electronic equivalent of a thermal-magnetic circuit breaker.
[41] This item is entering obsolescence. The purchase opportunity will extend until December 2021.

P-Frame 1200 A Unit-Mount

Electrically Operated P-Frame 800 A Unit-Mount

Table 7.77: P-Frame Interrupting Ratings

Voltage	P-Frame Interrupting Rating			
	G	J	K	L
240 Vac	65 kA	100 kA	65 kA	125 kA
480 Vac	35 kA	65 kA	50 kA	100 kA
600 Vac	18 kA	25 kA	50 kA	25 kA

Table 7.78: P-Frame Termination Options

Termination Letter
A = I-Line (See Section 9—Panelboards)
D = Drawout
F = No Lugs (Includes terminal nut kit on both ends)
L = Lugs both ends
M = Lugs ON end, terminal nut kit OFF end
P = Lugs OFF end, terminal nut kit ON end
P G **L** 3 6 0 4 0 U 4 1 A For factory-installed termination, place termination letter in the third block of the circuit breaker catalog number.

Dimensions see page 7-83
Trip Unit Options see page 7-62
Optional Lugs see page 7-56
Alternate Rating Plugs see page 7-64
Enclosures see page 7-84
Accessories see page 7-51

PowerPacT P-Frame Molded Case Circuit Breakers (1200 A)

- MicroLogic trip protection from 250 to 1200 A up to 600 Vac
- 2-, 3- and 4-pole unit-mount construction
- UL listed interrupting ratings from 35 kA to 100 kA at 480 Vac
- Same dimensions, common mounting, bussing, cabling and door cut-out as PowerPacT M-frame circuit breakers
- Standard (80%) and 100% rating
- UL, CSA, NOM, CCC and IEC certified and CE marked for global acceptance

Table 7.79: P-Frame 1200 A (600 Vac, 50/60 Hz) 3P *[42]* Circuit Breaker with Electronic Trip Unit

Electronic Trip Unit			Sensor Rating	Cat. No.*[43]*	Terminal Wire Range
Type	Function	Trip Unit			
Basic Electronic Trip Unit (Not Interchangeable)	Fixed long-time, Adjustable Instantaneous	E-T1.01	600 A	P■L36060	AL800M23K (3) 3/0 AWG–500 kcmil Al or Cu
			800 A	P■L36080	
			1000 A	P■L36100	AL1200P25K (4) 3/0 AWG–500 kcmil Al or Cu
			1200 A	P■L36120	
MicroLogic Interchangeable Standard Trip Unit	LI	3.0	250 A	P■L36025(C)U31A	AL800M23K (3) 3/0 AWG–500 kcmil Al or Cu
			400 A	P■L36040(C)U31A	
			600 A	P■L36060(C)U31A	
			800 A	P■L36080(C)U31A	
			1000 A	P■L36100(C)U31A	AL1200P25K (4) 3/0 AWG–500 kcmil Al or Cu
			1200 A	P■L36120(C)U31A	
	LSI	5.0	250 A	P■L36025(C)U33A	AL800M23K (3) 3/0 AWG–500 kcmil Al or Cu
			400 A	P■L36040(C)U33A	
			600 A	P■L36060(C)U33A	
			800 A	P■L36080(C)U33A	
			1000 A	P■L36100(C)U33A	AL1200P25K (4) 3/0 AWG–500 kcmil Al or Cu
			1200 A	P■L36120(C)U33A	
MicroLogic Interchangeable Ammeter Trip Unit	LI	3.0A	250 A	P■L36025(C)U41A	AL800M23K (3) 3/0 AWG–500 kcmil Al or Cu
			400 A	P■L36040(C)U41A	
			600 A	P■L36060(C)U41A	
			800 A	P■L36080(C)U41A	
			1000 A	P■L36100(C)U41A	AL1200P25K (4) 3/0 AWG–500 kcmil Al or Cu
			1200 A	P■L36120(C)U41A	
	LSI	5.0A	250 A	P■L36025(C)U43A	AL800M23K (3) 3/0 AWG–500 kcmil Al or Cu
			400 A	P■L36040(C)U43A	
			600 A	P■L36060(C)U43A	
			800 A	P■L36080(C)U43A	
			1000 A	P■L36100(C)U43A	AL1200P25K (4) 3/0 AWG–500 kcmil Al or Cu
			1200 A	P■L36120(C)U43A	
	LSIG	6.0A	250 A	P■L36025(C)U44A	AL800M23K (3) 3/0 AWG–500 kcmil Al or Cu
			400 A	P■L36040(C)U44A	
			600 A	P■L36060(C)U44A	
			800 A	P■L36080(C)U44A	
			1000 A	P■L36100(C)U44A	AL1200P25K (4) 3/0 AWG–500 kcmil Al or Cu
			1200 A	P■L36120(C)U44A	
MicroLogic Interchangeable Power Trip Unit	LSI	5.0P	250 A	P■L36025(C)U63AE1	AL800M23K (3) 3/0 AWG–500 kcmil Al or Cu
			400 A	P■L36040(C)U63AE1	
			600 A	P■L36060(C)U63AE1	
			800 A	P■L36080(C)U63AE1	
			1000 A	P■L36100(C)U63AE1	AL1200P25K (4) 3/0 AWG–500 kcmil Al or Cu
			1200 A	P■L36120(C)U63AE1	
	LSIG	6.0P	250 A	P■L36025(C)U64AE1	AL800M23K (3) 3/0 AWG–500 kcmil Al or Cu
			400 A	P■L36040(C)U64AE1	
			600 A	P■L36060(C)U64AE1	
			800 A	P■L36080(C)U64AE1	
			1000 A	P■L36100(C)U64AE1	AL1200P25K (4) 3/0 AWG–500 kcmil Al or Cu
			1200 A	P■L36120(C)U64AE1	
MicroLogic Interchangeable Harmonic Trip Unit	LSI	5.0H	250 A	P■L36025(C)U73AE1	AL800M23K (3) 3/0 AWG–500 kcmil Al or Cu
			400 A	P■L36040(C)U73AE1	
			600 A	P■L36060(C)U73AE1	
			800 A	P■L36080(C)U73AE1	
			1000 A	P■L36100(C)U73AE1	AL1200P25K (4) 3/0 AWG–500 kcmil Al or Cu
			1200 A	P■L36120(C)U73AE1	
	LSIG	6.0H	250 A	P■L36025(C)U74AE1	AL800M23K (3) 3/0 AWG–500 kcmil Al or Cu
			400 A	P■L36040(C)U74AE1	
			600 A	P■L36060(C)U74AE1	
			800 A	P■L36080(C)U74AE1	
			1000 A	P■L36100(C)U74AE1	AL1200P25K (4) 3/0 AWG–500 kcmil Al or Cu
			1200 A	P■L36120(C)U74AE1	

[42] For 2P and 4P information see Catalog 0612CT0101.

[43] To complete the catalog number:
Replace the ■ with the appropriate interrupting rating (G, J, K or L).
For all L interrupting ratings, change the 5th character (voltage rating) from a 6 (600 V) to a 4 (480V). The 480 V AIR is standard 100 kA.
For 100% rated circuit breakers, add a "C" in the 9th character place. For example, the catalog number for a 100% rated trip unit with LI trip functions at 250 A would be PBL36025CU31A.

R-Frame Unit-Mount

Table 7.80: R-Frame Interrupting Ratings

Voltage	R-Frame Interrupting Rating			
	G	J	K	L
240 Vac	65 kA	100 kA	65 kA	125 kA
480 Vac	35 kA	65 kA	65 kA	100 kA
600 Vac	18 kA	25 kA	65 kA	50 kA

Table 7.81: R-Frame Termination Options

Termination Letter
A = I-Line (See Section 9—Panelboards)
F = No Lugs (Includes terminal nut kit on both ends)
RJ **F** 3 6 3 0 0 U 4 1 A For factory-installed termination, place termination letter in the third block of the circuit breaker catalog number.

Dimensions see page 7-83
Trip Unit Options see page 7-62
Optional Lugs see page 7-56
Alternate Rating Plugs see page 7-64
Enclosures see page 7-84
Accessories see page 7-51

PowerPacT R-Frame Molded Case Circuit Breakers (3000 A)

- MicroLogic electronic trip protection from 600–3000A up to 600 Vac
- 2-, 3- and 4-pole construction
- UL listed interrupting ratings from 35 to 100 kA at 480Vac
- Built-in Modbus protocol
- Standard (80%) and 100% rating
- UL, CSA, NOM, CCC and IEC certified and CE marked for global acceptance

Table 7.82: R-Frame 3000 A (600 Vac, 50/60 Hz) 3P Circuit Breaker with Electronic Trip Unit

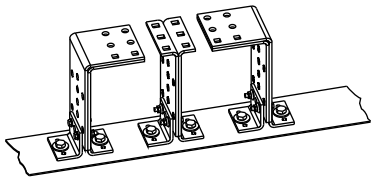
Electronic Trip Unit *[44]*			Sensor Rating	Cat. No. *[45]*
Type	Function	Trip Unit		
Basic Electronic Trip Unit (Not Interchangeable)	Fixed long-time, Adjustable Instantaneous	ET1.0I	1200 A	R■F36120
			1600 A	R■F36160
			2000 A	R■F36200
			2500 A	R■F36250
MicroLogic Interchangeable Standard Trip Unit	LI	3.0	600 A	R■F36060(C)U31A
			800 A	R■F36080(C)U31A
			1000 A	R■F36100(C)U31A
			1200 A	R■F36120(C)U31A
			1600 A	R■F36160(C)U31A
			2000 A	R■F36200(C)U31A
			2500 A	R■F36250(C)U31A
			3000 A	R■F36300(C)U31A
	LSI	5.0	600 A	R■F36060(C)U33A
			800 A	R■F36080(C)U33A
			1000 A	R■F36100(C)U33A
			1200 A	R■F36120(C)U33A
			1600 A	R■F36160(C)U33A
			2000 A	R■F36200(C)U33A
			2500 A	R■F36250(C)U33A
			3000 A	R■F36300(C)U33A
MicroLogic Interchangeable Ammeter Trip Unit	LI	3.0A	600 A	R■F36060(C)U41A
			800 A	R■F36080(C)U41A
			1000 A	R■F36100(C)U41A
			1200 A	R■F36120(C)U41A
			1600 A	R■F36160(C)U41A
			2000 A	R■F36200(C)U41A
			2500 A	R■F36250(C)U41A
			3000 A	R■F36300(C)U41A
	LSI	5.0A	600 A	R■F36060(C)U43A
			800 A	R■F36080(C)U43A
			1000 A	R■F36100(C)U43A
			1200 A	R■F36120(C)U43A
			1600 A	R■F36160(C)U43A
			2000 A	R■F36200(C)U43A
			2500 A	R■F36250(C)U43A
			3000 A	R■F36300(C)U43A
	LSIG	6.0A	600 A	R■F36060(C)U44A
			800 A	R■F36080(C)U44A
			1000 A	R■F36100(C)U44A
			1200 A	R■F36120(C)U44A
			1600 A	R■F36160(C)U44A
			2000 A	R■F36200(C)U44A
			2500 A	R■F36250(C)U44A
			3000 A	R■F36300(C)U44A
MicroLogic Interchangeable Power Trip Unit	LSI	5.0P	600 A	R■F36060(C)U63AE1
			800 A	R■F36080(C)U63AE1
			1000 A	R■F36100(C)U63AE1
			1200 A	R■F36120(C)U63AE1
			1600 A	R■F36160(C)U63AE1
			2000 A	R■F36200(C)U63AE1
			2500 A	R■F36250(C)U63AE1
			3000 A	R■F36300(C)U63AE1
	LSIG	6.0P	600 A	R■F36060(C)U64AE1
			800 A	R■F36080(C)U64AE1
			1000 A	R■F36100(C)U64AE1
			1200 A	R■F36120(C)U64AE1
			1600 A	R■F36160(C)U64AE1
			2000 A	R■F36200(C)U64AE1
			2500 A	R■F36250(C)U64AE1
			3000 A	R■F36300(C)U64AE1
MicroLogic Interchangeable Harmonic Trip Unit	LSI	5.0H	600 A	R■F36060(C)U73AE1
			800 A	R■F36080(C)U73AE1

[44] For 2P and 4P information see Catalog **0612CT0101**.

[45] To complete the catalog number: Replace the ■ with the appropriate interrupting rating (G, J, K or L).; For 100% rated circuit breakers, add a “C” in the 9th character place. For example, the catalog number for a 100% rated trip unit with LI trip functions at 2500 A would be RGF36025CU31A.

Table 7.82 R-Frame 3000 A (600 Vac, 50/60 Hz) 3P Circuit Breaker with Electronic Trip Unit (cont'd.)

Electronic Trip Unit *[46]*			Sensor Rating	Cat. No. *[47]*
Type	Function	Trip Unit		
			1000 A	R■F36100(C)U73AE1
			1200 A	R■F36120(C)U73AE1
			1600 A	R■F36160(C)U73AE1
			2000 A	R■F36200(C)U73AE1
			2500 A	R■F36250(C)U73AE1
			3000 A	R■F36300(C)U73AE1
	LSIG	6.0H	600 A	R■F36060(C)U74AE1
			800 A	R■F36080(C)U74AE1
			1000 A	R■F36100(C)U74AE1
			1200 A	R■F36120(C)U74AE1
			1600 A	R■F36160(C)U74AE1
			2000 A	R■F36200(C)U74AE1
			2500 A	R■F36250(C)U74AE1
			3000 A	R■F36300(C)U74AE1



RTLB Terminal Pad Kit

Unit-Mount R-Frame Standard Bus Connection

R-frame circuit breakers can be bus- or cable-connected.

- For cable connections, an optional terminal pad kit RLTB or equivalent bus structure is required.
- RLTB kits comes standard with bus bar connections.

RTLB / RT3B Kits

- RLTB kits are included with 2500 A 100% rated circuit breakers.
- Each kit contains terminal pads for one end of the circuit breaker only
- Has provisions for mounting a maximum of 8 lugs per phase (9 lugs for 3000 A).
- RL3TB kits are included with the 3000 A, 80% and 100% rated circuit breakers.

R-Frame I-Line circuit breakers come with lugs on the load side. (See Panelboards—Section 9).

For other circuit breakers, order terminal pad kit (RLTB) and optional lugs separately. See Terminal Nuts, Terminal Pads, Terminal Shields and Accessories, page 7-59 and Mechanical Lugs, page 7-56.

[46] For 2P and 4P information see Catalog **0612CT0101**.

[47] To complete the catalog number: Replace the ■ with the appropriate interrupting rating (G, J, K or L).; For 100% rated circuit breakers, add a “C” in the 9th character place. For example, the catalog number for a 100% rated trip unit with LI trip functions at 2500 A would be RGF36025CU31A.

PowerPacT J-Frame

PowerPacT Mission Critical Circuit Breakers

Delivering high levels of selective coordination in a flexible design that can be easily configured for a variety of applications.

- Adjustable long-time settings in three sensor sizes provide coverage from 70-600 A on 120-240, 208Y/120, 240, and 480Y/277 Vac systems
- Undergone rigorous testing procedures to certify the coordination with downstream circuit breakers
- Available in J-Frame (250A) and L-Frame (600A)
- UL 489 listed, CSA Certified Voltage: 480Y/277V

Table 7.83: J-Frame 250 A Electronic Trip Mission Critical 80% Rated Circuit Breakers (480/277 Vac) with Factory Sealed Trip Units Suitable for Reverse Connection

Electronic Trip Unit Type	Trip Function	Trip Unit	Continuous Current	Cat. No.				Terminal
				D Interrupting	G Interrupting	J Interrupting	L Interrupting	
Standard	LI	3.2 W	250 A	JDL34250WU31X	JGL34250WU31X	JJL34250WU31X	JLL34250WU31X	AL250JD *[1]*
Standard	LSI	3.2S-W	250 A	JDL34250WU33X	JGL34250WU33X	JJL34250WU33X	JLL34250WU33X	AL250JD *[1]*
High Perf. Ammeter	LSI	5.2A-W	250 A	JDL34250WU43X	JGL34250WU43X	JJL34250WU43X	JLL34250WU43X	AL250JD *[1]*
High Perf. Energy	LSI	5.2E-W	250 A	JDL34250WU53X	JGL34250WU53X	JJL34250WU53X	JLL34250WU53X	AL250JD *[1]*
High Perf. Ammeter	LSIG	6.2A-W	250 A	JDL34250WU44X	JGL34250WU44X	JJL34250WU44X	JLL34250WU44X	AL250JD *[1]*
High Perf. Energy	LSIG	6.2E-W	250 A	JDL34250WU54X	JGL34250WU54X	JJL34250WU54X	JLL34250WU54X	AL250JD *[1]*

Table 7.84: L-Frame 600 A Electronic Trip Mission Critical Circuit Breakers (480/277 Vac) with Factory Sealed Trip Units Suitable for Reverse Connection *[2]*

Electronic Trip Unit Type	Trip Function	Trip Unit	Continuous Current	Cat. No.				Terminal
				D Interrupting	G Interrupting	J Interrupting	L Interrupting.	
480/277 Vac, 50/60 Hz, 3P								
Standard	LI	3.3 W	250 A	LDL34250WU31X	LGL34250WU31X	LJL34250WU31X	LLL34250WU31X	AL400L61K3 *[3]*
			400 A	LDL34400WU31X	LGL34400WU31X	LJL34400WU31X	LLL34400WU31X	AL600LS52K3 *[4]*
			600 A	LDL34600WU31X	LGL34600WU31X	LJL34600WU31X	LLL34300WU31X	
Standard	LSI	3.3S-W	250 A	LDL34250WU33X	LGL34250WU33X	LJL34250WU33X	LLL34250WU33X	AL400L61K3 *[3]*
			400 A	LDL34400WU33X	LGL34400WU33X	LJL34400WU33X	LLL34400WU33X	AL600LS52K3 *[4]*
			600 A	LDL34600WU33X	LGL34600WU33X	LJL34600WU33X	LLL34300WU33X	
High Perf. Ammeter	LSI	5.3A-W	400 A	LDL34400WU43X	LGL34400WU43X	LJL34400WU43X	LLL34400WU43X	AL600LS52K3 *[4]*
			600 A	LDL34600WU43X	LGL34600WU43X	LJL34600WU43X	LLL34300WU43X	
High Perf. Energy	LSI	5.3E-W	400 A	LDL34400WU53X	LGL34400WU53X	LJL34400WU53X	LLL34400WU53X	AL600LS52K3 *[4]*
			600 A	LDL34600WU53X	LGL34600WU53X	LJL34600WU53X	LLL34300WU53X	
High Perf. Ammeter	LSIG	6.3A-W	400 A	LDL34400WU44X	LGL34400WU44X	LJL34400WU44X	LLL34400WU44X	AL600LS52K3 *[4]*
			600 A	LDL34600WU44X	LGL34600WU44X	LJL34600WU44X	LLL34300WU44X	
High Perf. Energy	LSIG	6.3E-W	400 A	LDL34400WU54X	LGL34400WU54X	LJL34400WU54X	LLL34400WU54X	AL600LS52K3 *[4]*
			600 A	LDL34600WU54X	LGL34600WU54X	LJL34600WU54X	LLL34300WU54X	
480/277 Vac, 50/60 Hz, 4P								
Standard	LI	3.3 W	250 A	LDL44250WU31X	LGL44250WU31X	LJL44250WU31X	LLL44250WU31X	AL400L61K4 *[3]*
			400 A	LDL44400WU31X	LGL44400WU31X	LJL44400WU31X	LLL44400WU31X	AL600LS52K4 *[4]*
			600 A	LDL44600WU31X	LGL44600WU31X	LJL44600WU31X	LLL44300WU31X	
Standard	LSI	3.3S-W	250 A	LDL44250WU33X	LGL44250WU33X	LJL44250WU33X	LLL44250WU33X	AL400L61K4 *[3]*
			400 A	LDL44400WU33X	LGL44400WU33X	LJL44400WU33X	LLL44400WU33X	AL600LS52K4 *[4]*
			600 A	LDL44600WU33X	LGL44600WU33X	LJL44600WU33X	LLL44300WU33X	
High Perf. Ammeter	LSI	5.3A-W	400 A	LDL44400WU43X	LGL44400WU43X	LJL44400WU43X	LLL44400WU43X	AL600LS52K4 *[4]*
			600 A	LDL44600WU43X	LGL44600WU43X	LJL44600WU43X	LLL44300WU43X	
High Perf. Energy	LSI	5.3E-W	400 A	LDL44400WU53X	LGL44400WU53X	LJL44400WU53X	LLL44400WU53X	AL600LS52K3 *[4]*
			600 A	LDL44600WU53X	LGL44600WU53X	LJL44600WU53X	LLL44300WU53X	
High Perf. Ammeter	LSIG	6.3A-W	400 A	LDL44400WU44X	LGL44400WU44X	LJL44400WU44X	LLL44400WU44X	AL600LS52K4 *[4]*
			600 A	LDL44600WU44X	LGL44600WU44X	LJL44600WU44X	LLL44300WU44X	
High Perf. Energy	LSIG	6.3E-W	400 A	LDL44400WU54X	LGL44400WU54X	LJL44400WU54X	LLL44400WU54X	AL600LS52K4 *[4]*
			600 A	LDL44600WU54X	LGL44600WU54X	LJL44600WU54X	LLL44300WU54X	

Table 7.85: Terminal Wire Ranges

Terminal	Wire Range
AL250JD	(1) 3/0 AWG 350 kcmil AL or Cu
AL400L61K3	(1) #2 AWG–500 kcmil Al or (1) #2 AWG–600 kcmil Cu.
AL600LS52K3	(2) 2/0 AWG–500 kcmil Al or Cu.

Accessories see page 7-51
Optional Lugs see page 7-56
Compression and PDC Lugs see Supplemental Digest, Section 3
Dimensions see page 7-83
Enclosures see page 7-84

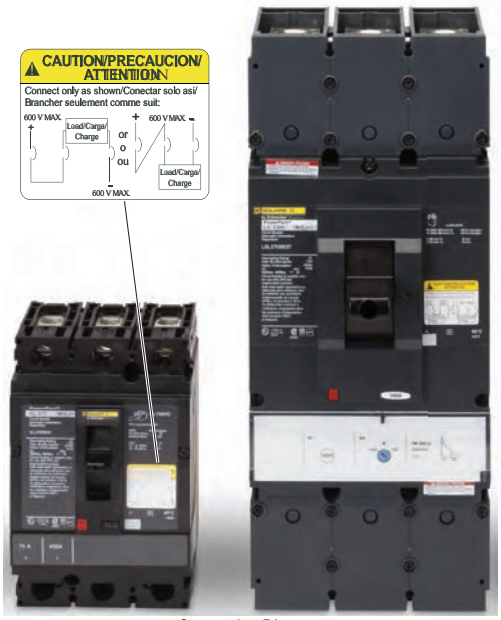
Table 7.86: J- and L-Frame Termination Options

Termination Letter	
A = I-Line (See Section 9)	J G **L** 3 6 1 0 0 For factory-installed termination, place termination letter in the third block of the circuit breaker catalog number. Termination Letter
F = No Lugs (includes terminal nut kit on both ends) *[5]*	
L = Lugs both ends	
M = Lugs ON end Terminal Nut Kit OFF end	
P = Lugs OFF end Terminal Nut Kit ON end	
N = Plug-in	
D = Drawout	
S = Rear Connected	

Table 7.87: J- and L-Frame Interrupting Ratings

Voltage	Interrupting Rating			
	D	G	J	L
240 Vac	25 kA	65 kA	100 kA	125 kA
480 Vac	18 kA	35 kA	65 kA	100 kA

[1] AL250JD terminal wire range is (1) 3/0 AWG–350 kcmil Al or Cu.
[2] 100% rated for 250 A and 400 A. 80% rated for 600 A.
[3] AL400L61K3 terminal wire ranges are (1) #2 AWG–500 kcmil Al or (1) #2 AWG–600 kcmil Cu.
[4] AL600LS52K3 terminal wire ranges are (2) 2/0 AWG–500 kcmil Al or Cu.
[5] Add TS suffix for circuit breaker without terminal nut kit.



Connection Diagram

PowerPacT 500 Vdc Circuit Breakers

Designed for use on ungrounded dc systems having a maximum short-circuit voltage of 500 Vdc or a maximum floating (unloaded) voltage of 600 Vdc. Suitable for use only with UPS (ungrounded uninterruptable power supplies systems).

This two-level voltage rating allows these circuit breakers to be applied to battery sources having a short-circuit availability of 20,000 amperes or 50,000 amperes for PowerPacT H-, J-, and L-frame DC circuit breakers at 500 Vdc. IEC 500 Vdc rating is available on PowerPacT J-frame circuit breakers.

PowerPacT H-frame DC circuit breakers have a fixed magnetic trip system. PowerPacT J- and L-frame DC circuit breakers are provided with an adjustable magnetic trip that is readily accessible by means of a single adjustment on the face of the circuit breaker.

PowerPacT H- and J-frame circuit breakers are UL Listed for the interrupting ratings shown only if applied with three poles connected in series (series connection is external to circuit breaker). (See figure for example of diagram.)

PowerPacT L-frame circuit breakers are UL Listed for the interrupting ratings shown with two or three poles connected in series (series connection is external to circuit breaker).

NOTE: Due to external series connection, I-Line™ circuit breakers are not available for this application.

Table 7.88: 500 Vdc Termination Options

Termination Letter	Termination Option
F	No Lugs (bus bar connection)
L	Lugs Both Ends
S	Rear Connection
JGL37125D81–Place termination letter in third block of circuit breaker catalog number.	

Table 7.89: 500 Vdc Molded Case Circuit Breakers

Ampere Rating	Circuit Breaker Cat. No.	Fixed Magnetic Trip —DC Amperes	Adjustable Magnetic Trip Range—DC Amperes *[1]*		Interrupting Rating @ 500 Vdc
			Low	High	
30 A	HGL37030D87	450	—	—	20 k AIR
50 A	HGL37050D87	450	—	—	
70 A	HGL37070D87	450	—	—	
100 A	JGL37100D81	—	400	600	20 k AIR
125 A	JGL37125D81	—	400	600	
150 A	JGL37150D81	—	400	600	
175 A	JGL37175D81	—	400	600	
200 A	JGL37200D82	—	500	850	
225 A	JGL37225D82	—	500	850	
250 A	JGL37250D82	—	500	850	20 k AIR
300 A	LGL37030D27	—	750	1500	20 k AIR
350 A	LGL37035D29	—	875	1750	
400 A	LGL37040D30	—	1000	2000	
450 A	LGL37045D31	—	1125	2250	
500 A	LGL37050D32	—	1250	2500	
600 A	LGL37060D33	—	1500	3000	
700 A	LGL47070D35	—	1750	3500	
800 A	LGL47080D36	—	2000	4000	
900 A	LGL47090D86	—	2250	4500	
1000 A	LGL47100D40	—	2500	5000	
1200 A	LGL47120D42	—	3000	6000	
30A	HLL37030D87	450	—	—	50 k AIR
50A	HLL37050D87	450	—	—	
70A	HLL37070D87	450	—	—	
100A	JLL37100D81	—	400	600	50 k AIR
125A	JLL37125D81	—	400	600	
150A	JLL37150D81	—	400	600	
175A	JLL37175D81	—	400	600	
200A	JLL37200D82	—	500	850	
225A	JLL37225D82	—	500	850	
250A	JLL37250D82	—	500	850	
300A	LLL37030D27	—	750	1500	50 k AIR
350A	LLL37035D29	—	875	1750	
400A	LLL37040D30	—	1000	200	
450 A	LLL36045D31	—	1125	2250	
500 A	LLL37050D32	—	1250	2500	
600 A	LLL37060D33	—	1500	3000	
700 A	LLL47070D35	—	1750	3500	
800 A	LLL47080D36	—	2000	4000	
900 A	LLL47090D86	—	2250	4500	
1000 A	LLL47100D40	—	2500	5000	
1200 A	LLL47120D42	—	3000	6000	

Table 7.90: Automatic Molded Case Switch

Frame	Poles	Ampere Rating	Trip Point	Interrupting Rating	
				G	J
2P, 600 Vac 50/60 Hz					
M	2	800	10 kA	–	MJL26000S80
3P, 600 Vac 50/60 Hz					
M	3	800	10 kA	–	MJL36000S80

Accessories see page 7-51 and Supplemental Digest Section 3
Optional Lugs see page 7-56 and Supplemental Digest Section 3
Dimensions see page 7-83 and Supplemental Digest Section 3
Enclosures see page 7-87

[1] Magnetic trip tolerances are -20%/+30% from the nominal values shown.

J-Frame Switch

L-Frame Switch

PowerPacT Automatic Switches

Automatic molded case switches open instantaneously at a factory preset magnetic trip point. Calibrated to protect only the molded case switch itself, when it is subjected to high fault currents. The trip point is nonadjustable and provides no overload or low level fault protection.

- PowerPacT™ H-, J-, and L-frame automatic switches are available in unit mount, I-Line™, plug-in and drawout versions.
- Accept the same lugs and accessories as equivalent thermal-magnetic circuit breakers *[1]*.
- May be interlocked with another switch or circuit breaker to form a source-changeover system
- UL Listed per UL 489 and CSA Certified.

Table 7.91: PowerPacT™ B-Frame Automatic Molded Case Switches, 600 Vac

Circuit Breaker	Poles	Ampere Rating	D Withstand		G Withstand		J Withstand		Terminal	Wire Range
			Cat. No.	Trip Point	Cat. No.	Trip Point	Cat. No.	Trip Point		
B-Frame	2 *[2]*	125 A	BDL26000S12	1625 A	BGL26000S12	1625 A	BJL26000S12	1625 A	LV426973	14–2/0 AWG Cu
	3	125 A	BDL36000S12	1625 A	BGL36000S12	1625 A	BJL36000S12	1625 A	LV426974	14–2/0 AWG Cu

Table 7.92: H-, J-, and L-Frame PowerPacT™ Automatic Molded Case Switches, 600 Vac

Circuit Breaker	Poles	Ampere Rating	G Withstand		L Withstand		R Withstand		Terminal	Wire Range
			Cat. No.	Trip Point	Cat. No.	Trip Point	Cat. No.	Trip Point		
H-Frame J-Frame	2	150 A	HGL26000S15 *[2]*	2250 A	HLL26000S15	2250 A	—	—	AL150HD	14 AWG–3/0 AWG Al/Cu
		175 A	JGL26000S17	3125 A	JLL26000S17	3125 A	—	—	AL175JD	4–4/0 AWG Al/Cu
		250 A	JGL26000S25	3125 A	JLL26000S25	3125 A	—	—	AL250JD	3/0 AWG–350 kcmil Al/Cu
	3	150 A	HGL36000S15	2250 A	HLL36000S15	2250 A	—	—	AL150HD	14 AWG–3/0 AWG Al/Cu
		175 A	JGL36000S17	3125 A	JLL36000S17	3125 A	JRL36000S17	3125 A	AL175JD	4–4/0 AWG Al/Cu
		250 A	JGL36000S25	3125 A	JLL36000S25	3125 A	JRL36000S25	3125 A	AL250JD	3/0 AWG–350 kcmil Al/Cu
L-Frame	3	400 A	LGL36000S40X	4800 A	LLL36000S40X	4800 A	LRL36000S40X	4800 A	AL150HD	AL600LS52K3 (2) 2/0 AWG–500 kcmil Al/Cu
		600 A	LGL36000S60X	6600A	LLL36000S60X	6600 A	LRL36000S60X	6600 A	AL250JD	
	4	400 A	LGL46000S40X	4800 A	LLL46000S40X	4800 A	LRL46000S40X	4800 A	AL150HD	AL600LS52K4 (2) 2/0 AWG–500 kcmil Al/Cu
		600 A	LGL46000S60X	6600A	LLL46000S60X	6600 A	LRL46000S60X	6600 A	AL250JD	

Table 7.93: P-Frame and R-Frame PowerPacT™ Automatic Molded Case Switches *[3]*, 600 Vac

Frame	Poles	Ampere Rating	J Withstand		K Withstand		L Withstand		Terminal	Wire Range
			Cat. No.	Trip Point	Cat. No.	Trip Point	Cat. No.	Trip Point		
M	2	800 A	MJL26000S80	10 kA	—	—	—	—	AL800M23K	(3) 3/0 AWG–500 kcmil Al or Cu
	3	800 A	MJL36000S80	10 kA	—	—	—	—	AL800M23K	(3) 3/0 AWG–500 kcmil Al or Cu
P	2	600 A	PJL26000S60	10 kA	PKL26000S60	24 kA	PLL24000S60 *[4]*	10 kA	AL800M23K	(3) 3/0 AWG–500 kcmil Al or Cu
		800 A	PJL26000S80	10 kA	PKL26000S80	24 kA	PLL24000S80 *[4]*	10 kA		
		1000 A	PJL26000S10	10 kA	PKL26000S10	24 kA	PLL24000S10 *[4]*	10 kA	AL1200P25K	(4) 3/0 AWG–500 kcmil Al or Cu
		1200 A	PJL26000S12	10 kA	PKL26000S12	24 kA	PLL24000S12 *[4]*	10 kA		
	3	600 A	PJL36000S60	10 kA	PKL36000S60	24 kA	PLL34000S60 *[4]*	10 kA	AL800M23K	(3) 3/0 AWG–500 kcmil Al or Cu
		800 A	PJL36000S80	10 kA	PKL36000S80	24 kA	PLL34000S80 *[4]*	10 kA		
		1000 A	PJL36000S10	10 kA	PKL36000S10	24 kA	PLL34000S10 *[4]*	10 kA	AL1200P25K	(4) 3/0 AWG–500 kcmil Al or Cu
		1200 A	PJL36000S12	10 kA	PKL36000S12	24 kA	PLL34000S12 *[4]*	10 kA		
R	2	1200 A	—	—	RKF26000S12	57 kA	RLF26000S12	48 kA	R-frame circuit breakers can be bus-connected or cable-connected. For cable connections, RLTB kit or equivalent bus structure is required. Kit is included with 3000 A switches. For all others, see page 7-59.	
		1600 A	—	—	RKF26000S16	57 kA	RLF26000S16	48 kA		
		2000 A	—	—	RKF26000S20	57 kA	RLF26000S20	48 kA		
		2500 A	—	—	RKF26000S25	57 kA	RLF26000S25	48 kA		
	3	1200 A	—	—	RKF36000S12	57 kA	RLF36000S12	48 kA		
		1600 A	—	—	RKF36000S16	57 kA	RLF36000S16	48 kA		
		2000 A	—	—	RKF36000S20	57 kA	RLF36000S20	48 kA		
		2500 A	—	—	RKF36000S25	57 kA	RLF36000S25	48 kA		
		3000 A	—	—	RKF36000S30	57 kA	RLF36000S30	48 kA		

Accessories see page 7-51 and Supplemental Digest Section 3
Optional Lugs see page 7-56 and Supplemental Digest Section 3
Dimensions see page 7-82 and page 7-83
Enclosures see page 7-84

Table 7.94: Q-Frame (240 Vac) PowerPacT™ Automatic Molded Case Switches

Circuit Breaker	Poles	Ampere Rating	J Withstand		Wire Range
			Cat. No.	Trip Point	
Q-Frame *[5]*	2	225 A	QBL22000S22	4500 A	4 AWG–300 kcmil
	3	225 A	QBL32000S22	4500 A	

Table 7.95: B-, H-, J-, L- P-, and R-Frame Withstand Ratings *[6]*

Voltage	Withstand					
	D	G	J	K	L	R
240 Vac	25 kA	65 kA	100 kA	65 kA	125 kA	200 kA
480 Vac	18 kA	35 kA	65 kA	50 kA *[7]*	100 kA	200 kA
600 Vac	14 kA	18 kA	25 kA	50 kA *[7]*	50 kA	100 kA

[1] Q-frame switches do not have electrical accessories available.
[2] True 2P device. Others are a 2P in a 3P module.
[3] UL magnetic trip tolerances are -20% / +30% from the nominal values shown.
[4] P-frame L-interrupting is available in 480 Vac only.
[5] Withstand rating of 10 kA at 240 Vac.
[6] The withstand rating is the fault current at rated voltage that the molded case switch will withstand without damage when protected by a circuit breaker with an equal continuous current rating.
[7] B- and R-frame withstand is 65 kA.

Instantaneous Trip Circuit Breakers for Motor Protection Applications

Adjustable instantaneous-trip circuit breakers are intended for use in combination with motor starters with overload relays for the protection of motor circuits from short circuits.

Other specific applications include rectifiers and resistance welders. These circuit breakers contain a magnetic trip element in each pole with the trip point adjustable from the front. Interrupting ratings are determined by testing the instantaneous-trip circuit breakers in combination with a contactor and overload relay.

Select instantaneous-trip circuit breakers as follows:

This selection table is suitable for motors, other than NEMA Design E, with locked-rotor indicating code letters per NEC® Table 430.7 (b) as follows:

Table 7.96: Locked-Rotor Indicating Codes

Horsepower	Motor Code Letter
1/2 or less	A–L
3/4 to 1-1/2	A–K
2 to 3	A–J
5 to 25	A–H
30 to 125	A–G
150 or more	A–F

- For other motors order a special thermal-magnetic circuit breaker with magnetic trip settings for the specific motor— specify motor horsepower, voltage, frequency, full-load current and code letter or locked rotor current.
- Determine motor hp rating from the motor nameplate.
- Refer to the tables and select an instantaneous-trip circuit breaker with an ampere rating recommended for the hp and voltage involved.
- Select an adjustable trip setting of at least 800%, not to exceed 1300%, of the motor full-load amperes (FLA) for other than Design E motors. For Design E motors, select an adjustable trip setting of at least 1100% not to exceed 1700% of FLA.
- The NEC 1300% maximum setting may be inadequate for instantaneous-trip circuit breakers to withstand current surges typical of the magnetization current of autotransformer type reduced voltage starters, or open transition wye-delta starters during transfer from “start” to “run,” constant hp multi-speed motors, and motors labeled “high efficiency.” Select thermal-magnetic circuit breakers for those applications.
- Part-winding motors, per NEC 430.4, should have two circuit breakers selected from the above at not more than one half the allowable trip setting for the horsepower rating. The two circuit breakers should operate simultaneously as a disconnecting means per NEC 430.103.
- Based on NEC 430.52 and NEC Table 430.250.

Table 7.97: Selection Tables for Conductors, Safety Switches and Thermal-Magnetic Circuit Breakers Based on 2017 NEC® Tables 430.247, 430.248 & 430.250

Horsepower Ratings									Full Load Amperage [1]	Amperage of Thermal-Magnetic [2] Inverse Time Circuit Breaker			QMB and Heavy Duty Switch with Time Delay Fuses [3]	Minimum Size metallic Conduit 75° C, C Wire Field-Installed Sized for 125% FLA [4]		
Squirrel-Cage and Wound-Rotor Motors with Norm. Torque Characteristics Operating at Usual Speeds				1Ø 10 Hz ac			Average Direct Current Motors Operating at Base Speed			For Motor Code Letter B to E		For Motor Code Letter F to V [5]		AWG kcmil	Conduit 3 W	
3Ø 60 Hz										Ordinary Service[6]	Heavy Service and Energy Efficient [7]				THHN THWN XHHW	THW
200 Vac [8]	230 Vac	460 Vac	575 Vac	115 Vac	200 Vac [8]	230 Vac	120 Vdc	240 Vdc								
						3/4			6.9 A	15 A	15 A	20 A	30 A	14	1/2 in.	N/A
				1/3					7.2 A							
		5					3.4		7.6 A		20 A					
2									7.8 A							
					3/4				7.9 A							
						1			8.0 A							
								2	8.5 A							
			7-1/2						9.0 A			25 A				
					1				9.2 A							
							1		9.5 A							
	3								9.6 A							
				1/2					9.8 A							
						1-1/2			10.0 A	20 A		30 A				
3		7-1/2	10						11.0 A		25 A					
					1-1/2				11.5 A							
						2			12.0 A							
								3	12.2 A	25 A		35 A				
							1-1/2		13.2 A							
				3/4	2				13.8 A							
		10							14.0 A							
	5								15.2 A	30 A	35 A	40 A				
				1					16.0 A							
			15			3	2		17.0 A			45 A				
5									17.5 A	35 A				12	1/2 in.	N/A
					3				19.6 A		40 A	50 A				
				1-1/2				5	20.0 A	40 A						
		15							21.0 A		45 A	60 A				
	7-1/2								22.0 A							
				2					24.0 A	45 A	50 A		60 A			
							3		25.0 A	50 A		70 A		10	1/2 in.	N/A
7-1/2									25.3 A		60 A					
		20	25						27.0 A							
	10				5				28.0 A							
								7-1/2	29.0 A	60 A		80 A				
			30						32.0 A		70 A					
10									32.2 A			90 A		8	1/2 in. [9]	N/A
		25		3					34.0 A							
								10	38.0 A	80 A	80 A	100 A				
						7-1/2	5		40.0 A							
									41.0 A		90 A	110 A				
	15								42.0 A							
					7–1/2				46.0 A	90 A	110 A	125 A		6	3/4 in.	1 in.
15									48.3 A							
						10			50.0 A							
		40	50						52.0 A			150 A	100 A			
	20								54.0 A							
								15	55.0 A							
				5					56.0 A		125 A					
					10				57.5 A							
							7-1/2		58.0 A					4	1 in.	1 in.
			60						62.0 A	100 A		175 A				
20									62.1 A							
		50							65.0 A		150 A					
	25								68.0 A							
								20	72.0 A	110 A		200 A				
							10		76.0 A	125 A	175 A			3	1 in.	1-1/4 in.
		60	75						77.0 A							
25									78.2 A	110 A						
	30			7-1/2					80.0 A							
								25	89.0 A	125 A		225 A	200 A	2	1 in.	1-1/4 in.

[1] Motor full load currents thru 200 hp are taken from NEC Tables 430.247, 248 and 250. Above 200 hp from UL 98. Select wire size, circuit breakers, or fuses on basis of hp rather than nameplate full load current per NEC 430.6. Do not use these values to select overload relay thermal units. See Digest pages 16-129—16152 for selection of thermal units when actual full load current is not known. Voltages listed are rated motor voltages. Corresponding nominal system voltages are 110–120 V, 200–208 V, 220–240 V, 440–480 V and 550–600 V

[2] Thermal-magnetic circuit breaker ampere ratings recommended are approximate for average conditions, based on trip characteristics of Square D circuit breakers and NEC Table 430.52. Under some conditions, the next size larger switch or circuit breaker rating may be necessary to accommodate the motor starting current and is permitted by NEC 430.52(C)(1) Exception 2. High starting currents are anticipated with Design E and other energy efficient motors. For explanation of Code letter markings, see NEC 430.7(B). For Busway Plug-in units, see page 9-7.

[3] Switch size only is shown in table. Selected fuses should not exceed maximum percent of full-load current as given in NEC Table 430.52. Above 50 hp dc switches are not hp rated by UL as Motor Circuit Switches, but as General Use Switches only and are not necessarily capable of interrupting the max. operating overload current of a motor. See NEC 100 for definition of General Use Switch. When protecting a 3Ø, Design E energy efficient motor, the switch is required by NEC 430.109 to have a hp rating of not less than 1.4 times that of a motor rated 3–100 hp, or not less than 1.3 times that of a motor rated over 100 hp. Switches shown in this table do not necessarily comply with that requirement.

[4] NEC 430.22 for Single Motor, Smaller conductors may be permitted for light duty-cycle service per 430.22 (B) Exception No. 1. DC motors operating from rectified 1Ø power supply will require larger conductors per 430.22 (A) Exception No. 1. For motor-generator arc welders, see 630.11

[5] Thermal-magnetic breaker ampere ratings recommended are approximate for average conditions and based on trip characteristics of Square D circuit breakers and NEC Tables 430.7(B) and 430.52.

[6] Ordinary service for normal starting duty only, acceleration time of 10 sec. or less.

[7] Heavy service is jogging or plugging duty or cycling load with over 25 starts per hour or over 5 starts per minute. Energy efficient motors are polyphase motors defined in NEMA Standard MG1 and exhibit high starting current.

[8] 200 V motors are commonly used on 208 V services.

[9] 8 XHHW requires 3/4 in. conduit for 3W.

Table 7.97 Selection Tables for Conductors, Safety Switches and Thermal-Magnetic Circuit Breakers Based on 2017 NEC® Tables 430.247, 430.248 & 430.250 (cont'd.)

Horsepower Ratings									Full Load Amperage [10]	Amperage of Thermal-Magnetic [11] Inverse Time Circuit Breaker			QMB and Heavy Duty Switch with Time Delay Fuses [12]	Minimum Size metallic Conduit 75° C, C Wire Field-Installed Sized for 125% FLA [13]		
Squirrel-Cage and Wound-Rotor Motors with Norm. Torque Characteristics Operating at Usual Speeds				1Ø 10 Hz ac			Average Direct Current Motors Operating at Base Speed			For Motor Code Letter B to E		For Motor Code Letter F to V [14]		AWG kcmil	Conduit 3 W	
3Ø 60 Hz										Ordinary Service [15]	Heavy Service and Energy Efficient [16]				THHN THWN XHHW	THW
200 Vac [17]	230 Vac	460 Vac	575 Vac	115 Vac	200 Vac [17]	230 Vac	120 Vdc	240 Vdc								
30									92.0 A		200 A	250 A				
		75							96.0 A							
			100						99.0 A	150 A				1	1-1/4 in.	1-1/2 in.
				10					100.0 A							
	40								104.0 A		225 A	300 A				
								30	106.0 A	175 A				1/0	1-1/4 in.	1-1/2 in.
40									120.0 A		250 A					
		100							124.0 A	200 A		350 A				
			125						125.0 A		250 A			2/0	1-1/2 in.	1-1/2 in.
	50								130.0 A		300 A					
								40	140.0 A							
			150						144.0 A			400 A				
50									150.0 A					3/0	1-1/2 in.	2 in.
	60								154.0 A	225 A	350 A					
		125							156.0 A							
								50	173.0 A	250 A						
60									177.0 A		400 A	500 A		4/0	2 in.	2 in.
		150							180.0 A							
	75		200						192.0 A					250	2 in.	2 in.
75									221.0 A	300 A	450 A	600 A		300	2 in.	2-1/2 in.
		200							240.0 A	350 A	500 A					
			250						242.0 A			700 A	400 A	350	2-1/2 in.	2-1/2 in.
	100								248.0 A							
100									285.0 A	400 A	600 A	800 A				
			300						289.0 A					500	3 in.	3 in.
		250							302.0 A		700 A					
	125								312.0 A	450 A				(2) 3/0	(2) 2-1/2 in.	(2) 2 in.
			350						336.0 A	500 A		900 A				
125									359.0 A	600 A	800 A			(2) 4/0	(2) 2 in.	(2) 2 in.
	150								360.0 A			1000 A				
		300							361.0 A							
			400						382.0 A				600 A	(2)300	(2) 2 in.	(2) 2-1/2 in.
150		350							414.0 A		900 A					
				500					472.0 A	800 A	1000 A	1200 A		(2) 350	(2) 2-1/2 in.	(2) 2-1/2 in.
			400						477.0 A							
		200							480.0 A							
200									552.0 A		1200 A	1600 A	—	(3) 300	(3) 2 in.	(3) 2-1/2 in.
		500							590.0 A	900 A						
	250								602.0 A							

Contact your local Field Office for circuit breaker selection on constant horsepower multi-speed motors.

[10] Motor full load currents thru 200 hp are taken from NEC Tables 430.247, 248 and 250. Above 200 hp from UL 98. Select wire size, circuit breakers, or fuses on basis of hp rather than nameplate full load current per NEC 430.6. Do not use these values to select overload relay thermal units. See Digest pages 16-129—16152 for selection of thermal units when actual full load current is not known. Voltages listed are rated motor voltages. Corresponding nominal system voltages are 110–120 V, 200–208 V, 220–240 V, 440–480 V and 550–600 V

[11] Thermal-magnetic circuit breaker ampere ratings recommended are approximate for average conditions, based on trip characteristics of Square D circuit breakers and NEC Table 430.52. Under some conditions, the next size larger switch or circuit breaker rating may be necessary to accommodate the motor starting current and is permitted by NEC 430.52(C)(1) Exception 2. High starting currents are anticipated with Design E and other energy efficient motors. For explanation of Code letter markings, see NEC 430.7(B). For Busway Plug-in units, see page 9-7.

[12] Switch size only is shown in table. Selected fuses should not exceed maximum percent of full-load current as given in NEC Table 430.52. Above 50 hp dc switches are not hp rated by UL as Motor Circuit Switches, but as General Use Switches only and are not necessarily capable of interrupting the max. operating overload current of a motor. See NEC 100 for definition of General Use Switch. When protecting a 3Ø, Design E energy efficient motor, the switch is required by NEC 430.109 to have a hp rating of not less than 1.4 times that of a motor rated 3–100 hp, or not less than 1.3 times that of a motor rated over 100 hp. Switches shown in this table do not necessarily comply with that requirement.

[13] NEC 430.22 for Single Motor, Smaller conductors may be permitted for light duty-cycle service per 430.22 (B) Exception No. 1. DC motors operating from rectified 1Ø power supply will require larger conductors per 430.22 (A) Exception No. 1. For motor-generator arc welders, see 630.11

[14] Thermal-magnetic breaker ampere ratings recommended are approximate for average conditions and based on trip characteristics of Square D circuit breakers and NEC Tables 430.7(B) and 430.52.

[15] Ordinary service for normal starting duty only, acceleration time of 10 sec. or less.

[16] Heavy service is jogging or plugging duty or cycling load with over 25 starts per hour or over 5 starts per minute. Energy efficient motors are polyphase motors defined in NEMA Standard MG1 and exhibit high starting current.

[17] 200 V motors are commonly used on 208 V services.

Accessories see page 7-51 and Supplemental Digest Section 3
Optional Lugs see page 7-56 and Supplemental Digest Section 3
Dimensions see page 7-83
Enclosures see page 7-84

PowerPacT Motor Protector Circuit Breakers—Two Device Solutions

MicroLogic 2.2M and 2.3M trip units provide built-in thermal and magnetic protections. Use PowerPacT Motor Protect Circuit Breakers in two-device motor feeder solutions to provide protection against short-circuits, overloads, and phase unbalance.

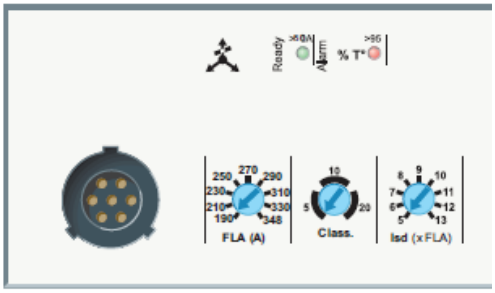
- Protection settings are made using a rotary switch.
- Accept the same accessories and terminals as equivalent PowerPacT circuit breakers.
- UL, CSA, IEC certified and CE marked for global acceptance.

Table 7.98: H-Frame (150 A), J-Frame (250 A) and L-Frame (600 A) Electronic Motor Protector Circuit Breakers (UL Ratings)—Two Device Solutions *[10]*

Electronic Trip Unit Type	Frame	Sensor Rating	Trip Unit	Full Load Amperes Range (FLA)	Isd (x FLA)	Interrupting Rating			
						G	J	L	R
Standard *[11]*	H-Frame	30	2.2 M	14–25	5-13 x FLA	HGL36030M38X	HJL36030M38X	HLL36030M38X	HRL36030M38X
		50		14–42	5-13 x FLA	HGL36050M38X	HJL36050M38X	HLL36050M38X	HRL36050M38X
		100		30–80	5-13 x FLA	HGL36100M38X	HJL36100M38X	HLL36100M38X	HRL36100M38X
		150		58–130	5-13 x FLA	HGL36150M38X	HJL36150M38X	HLL36150M38X	HRL36150M38X
	J-Frame	250		114–217	5-13 x FLA	JGL36250M38X	JJL36250M38X	JLL36250M38X	JRL36250M38X
	L-Frame	400	2.3 M	190–348	5-13 x FLA	LGL36400M38X	LJL36400M38X	LLL36400M38X	LRL36400M38X
		600		312–520	5-13 x FLA	LGL36600M38X	LJL36600M38X	LLL36600M38X	LRL36600M38X

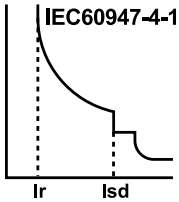
To select combination starters and motor controllers using MCP's meeting NEC Article 430, refer to Section 16.

HJL36100M38X
Motor Circuit Protector



MicroLogic 2.2M and 2.3M Trip Units

Ii=4800A



PowerPacT H, J, and L-Frame Motor Protectors

Table 7.99: Application of PowerPacT H- and L-Frame Motor Protector Circuit Breaker

Hp Ratings of Induction Type Squirrel-Cage and Wound Rotor Motors 3Ø 60 Hz				Full Load Amperes *[12]*	PowerPacT Family Motor Protector Circuit Breaker Cat. No. *[13]*	Magnetic Trip Settings *[14]*	
200 Vac	230 Vac	460 Vac	575 Vac			MIN	MAX
		10		14	H( )L36030M38X	500%	1300%
	5			15.2	H( )L36030M38X		
			15	17	H( )L36030M38X		
5				17.5	H( )L36030M38X		
		15		21	H( )L36030M38X	500%	1300%
	7-1/2		20	22	H( )L36030M38X		
7-1/2				25.3	H( )L36030M38X		
		20	25	27	H( )L36050M38X		
	10			28	H( )L36050M38X	500%	1300%
			30	32	H( )L36050M38X		
10				32.2	H( )L36050M38X		
		25		34	H( )L36050M38X		
		30		40	H( )L36050M38X	500%	1300%
			40	41	H( )L36050M38X		
	15			42	H( )L36050M38X		
15				48.3	H( )L36100M38X		
		40	50	52	H( )L36100M38X	500%	1300%
	20			54	H( )L36100M38X		
20			60	62	H( )L36100M38X		
		50		65	H( )L36100M38X		
					J( )L36250M38X		
75				221	L( )L36400M38X	500%	1300%
		200		240	L( )L36400M38X		
			250	242	L( )L36400M38X		
	100			248	L( )L36400M38X		
100				285	L( )L36400M38X	500%	1300%
			300	289	L( )L36400M38X		
		250		302	L( )L36400M38X		
	125			312	L( )L36400M38X		
			350	336	L( )L36400M38X	500%	1300%
125				359	L( )L36600M38X		
	150			360	L( )L36600M38X		
		300		361	L( )L36600M38X		
			400	382	L( )L36600M38X	500%	1300%
150		350		414	L( )L36600M38X		
			500	472	L( )L36600M38X		
		400		477	L( )L36600M38X		
	200			480	L( )L36600M38X		

[10] Two-device solutions (these electronic motor protector circuit breakers include short circuit and overload protection)
- 1 electronic motor circuit protector with a MicroLogic 2.2 M plus
- 1 contactor

[11] The standard trip unit offers Class 5, 10 and 20 and phase unbalance or phase loss protection.

[12] Motor full-load currents are taken from NEC Table 430.250. Select wire and circuit breakers on basis of horsepower rather than nameplate full-load current per NEC 430.6 (A) for general motor applications. Do not use these values to select overload relay thermal units. See Digest Secti0on 14 for selection of thermal units when actual full load current is not known. The voltages listed are rated motor voltages. Corresponding nominal system voltages are 200–208, 220–240, 440–480 and 550–600 V.

[13] To complete catalog number, replace the blank with the appropriate rating (G, J, L or R).

[14] Only MIN and MAX settings are shown, intermediate settings are available on all circuit breakers.

PowerPacT Accessories

Table 7.100: Electrical Accessories

Accessory	Description		Rated Voltage		B-, H-, J-, and L-Frame						M-, P-, and R-Frame	
					Factory Installed Cat. Suffix	B-Frame		H- and J-Frame	L-Frame		Factory Installed Cat. Suffix	Field-Installable Cat. No.
						Field-Installable Cat. No.	Field-Installable Pre-Wired Cat. No.	Field-Installable Cat. No.	Field-Installable Cat. No.			
Auxiliary and Alarm Switches (OF, SD, SDE)  B-Frame  H-, J-, L-, M-, P, and R-Frame	Provides circuit breaker contact status. Note: The location of the accessory in the circuit breaker determines its function.	Standard Min Load = 10mA with 24V	1 auxiliary switch (OF) 1a1b		AA	LV426950	LV426951	S29450	S29450		AA	S29450
			2 auxiliary switch (OF) 2a2b		AB	—	—	2x S29450	2x S29450		AB	2x S29450
			3 auxiliary switch (OF) 3a3b		AC	—	—	—	3x S29450		AC	3x S29450
			Alarm Switch (SD) 1a1b		BC	LV426950	LV426952	S29450	S29450		BC	S29450
			Overcurrent trip switch (SDE) 1a1b		BD	—	—	—	S29450		BD	S29450
			Consisting of:	OF Switch	—	—	—	S29450	—		—	—
				SDE Adapter	—	—	—	S29451	—		—	—
			Alarm switch and Overcurrent trip switch		BE	—	—	—	2x S29450		BE	2x S29450
			Consisting of:	OF Switch	—	—	—	2x S29450	—		—	—
				SDE Adapter	—	—	—	S29451	—		—	—
			Auxiliary Switch/Alarm Switch/ Adapter (OF/SD/SDE) Kit		—	—	—	—	—		—	S33801 *[1]*
		Low Level Min Load = 1mA with 24V	One auxiliary switch (OF) 1a1b		AE	—	—	S29452	S29452		AE	S29452
			Two auxiliary switches (OF) 2a2b		AF	—	—	2x S29452	2x S29452		AF	2x S29452
			3 auxiliary switches (OF) 3a3b		AG	—	—	—	3x S29452		AG	3x S29452
			Alarm Switch (SD) 1a1b		BH	—	—	S29452	S29452		BH	S29452
			Overcurrent trip switch (SDE) 1a1b		BJ	—	—	—	S29452		BJ *[2]*	S29452
			Consisting of:	OF Switch	—	—	—	S29452	—		—	—
				SDE Adapter	—	—	—	S29451	—		—	—
			Alarm switch and Overcurrent trip switch		BK	—	—	—	2x S29452		BK *[2]*	2x S29452
			Consisting of:	OF Switch	—	—	—	2x S29452	—		—	—
				SDE Adapter *[3]*	—	—	—	S29451	—		—	—
Shunt Trip (MX)  B-Frame  H-, J-, and L-Frame	Trips the circuit breaker from a remote location by means of a trip coil energized from a separate supply voltage circuit.		AC	24	SK	LV426841	LV426861	P29384	P29384		SK	S33659
				48	SL	LV426842	LV426862	P29385	P29385		SL	S33660
				110–130	SA	LV426843	LV426863	P29386	P29386		SA	S33661
				220–240	SD, SF	—	—	—	—		SC	S33662
				208–277	SD	LV426844	LV426864	P29387	P29387		SD	S33663
				380–480	SH	LV426846	LV426866	P29388	P29388		SH	S33664
				525–600	SJ	—	—	P29389	P29389		—	—
			DC	12	SN	LV426850	—	P29382	P29382		SN	S33658
				24	SO	LV426841	LV426861	P29390	P29390		SK	S33659
				30	SU	—	—	P29391	P29391		SK	S33659
				48	SP	LV426842	LV426862	P29392	P29392		SL	S33660
				60	SV	—	—	P29383	P29383		SL	S33660
				125	SR	LV426843	LV426863	P29393	P29393		SA	S33661
				250	SS	LV426844	LV426864	P29394	P29394		SC	S33662
Undervoltage Trip (MN) H-, J-, and L-Frame 	Instantaneously opens the circuit breaker when the under-voltage trip supply voltage drops to a value between 35% and 70% of its rated voltage. Closing is allowed when the supply voltage of the undervoltage trip reaches 85% of rated voltage.		AC	24	UK	LV426801	LV426821	P29404	P29404		UK	S33668
				48	UL	LV426802	LV426822	P29405	P29405		UL	S33669
				110–130	UA	LV426803	LV426823	P29406	P29406		UA	S33670
				220–240	UC	LV426804	LV426824	—	—		UC	S33671
				208–277	UD	LV426805	LV426825	P29407	P29407		—	—
				380–415	UF	LV426806	LV426826	—	—		—	—
				380–480	UH	LV426807	LV426827	P29408	P29408		UH	S33673
				525–600	UJ	—	—	P29409	P29409		—	—
			DC	12	UN	—	—	P29402	P29402		—	—
				24	UO	LV426801	LV426821	P29410	P29410		UK	S33668
				30	UU	—	—	P29411	P29411		UK	S33668
				48	UP	LV426802	LV426822	P29412	P29412		UL	S33669
				60	UV	—	—	P29403	P29403		UL	S33669
				125	UR	LV426803	LV426823	P29413	P29413		UA	S33670
				250	US	LV426815	LV426835	P29414	P29414		UC	S33671
Time Delay Unit 	Undervoltage trip with externally mounted adjustable time delay unit for UVR of 0.5, 0.9, 1.5, 3.0 seconds before circuit breaker trips		AC/DC	48	—	S33680 *[4]*	—	S33680 *[4]*	S33680 *[4]*		—	S33680 *[4]*
				100–130	—	S33681 *[4]*	—	S33681 *[4]*	S33681 *[4]*		—	S33681 *[4]*
				220–250	—	S33682 *[4]*	—	S33682 *[4]*	S33682 *[4]*		—	S33682 *[4]*
				380–480	—	—	—	—	—		—	S33683 *[4]*
	Undervoltage trip with externally mounted non-adjustable time delay unit of 0.25 sec before circuit breaker trips.		AC/DC	48	—	S29426 *[4]*	—	S29426 *[4]*	S29426 *[4]*		—	—
				100–130	—	—	—	—	—		—	S33684 *[4]*
				200–250	—	—	—	—	—		—	S33685 *[4]*
				220–240	—	S29427 *[4]*	—	S29427 *[4]*	S29427 *[4]*		—	—

[1] P-frame drawout circuit breaker only.
[2] Not available on electrically operated P-frame.
[3] SDE Adapter used for H- and J-frame only.
[4] Field-installable kit includes time delay module only. Order undervoltage trip separately.

Motor Operators

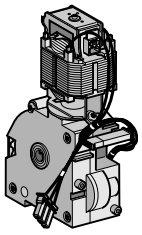
Motor Operators for H-, J-, and L-Frame Circuit Breakers

- Circuit-breaker indications and information remain visible and accessible, including trip-unit settings and indications
- Suitability for isolation is maintained and padlocking remains possible
- All termination connection (fixed, plug-in/withdrawable) possibilities are maintained
- Double insulation of the front face

Description		Rated Voltage		Factory Installed Cat. No. Suffix	Field-Installable Kit		
					H-Frame *[5]* Cat. No.	J-Frame Cat. No.	L-Frame 600 A Cat. No.
 Motor Operator	Standard motor for electrically-operated circuit breakers *[6]*	AC	48–60	ML	S29440	S31548	S432639
			110–130	MA	S29433	S31540	S432640
			208–277 220–240	MD	S29434	S31541	S432641
			380–415	MF	—	—	S432642
			440–480	MH	S29435	S31542	S432647
		DC	24–30	MO	S29436	S31543	S432643
			48–60	MV	S29437	S31544	S432644
			110–130	MR	S29438	S31545	S432645
			250	MS	S29439	S31546	S432646
	Communicating motor for electrically-operated circuit breakers *[7]*	AC	220–240	NC	S429441	S431549	S432652
	Locking device	Mounting hardware		—	—	—	S32649
		Ronis lock		—	S41940	S41940	S41940
		Profalux lock		—	S42888	S42888	S42888
		Mounting hardware plus Ronis lock		—	S429449	S429449	—
	Operations counter			—	—	—	S32648
	Adapter for I-Line circuit breaker			—	S37420	S37420	—

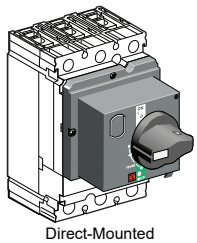
Spring-Charging Motors for Electrically-Operated P-Frame Circuit Breakers

Automatically charges the spring mechanism for closing the P-frame circuit breaker and also recharges the spring mechanism when the circuit breaker is in the ON position. Instantaneous reclosing of the circuit breaker is thus possible following circuit breaker opening.

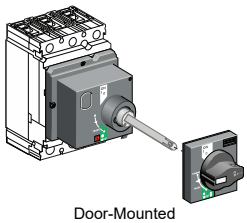
Description		Rated Voltage		Factory Installed Cat. No. Suffix	P-Frame (For Field Replacement Only) Spring Charging Motor Cat. No.	Replacement Coils Opening/Closing Coil Cat. No.
 Spring-Charging Motor	Standard motor for electrically-operated circuit breakers. Factory-installed includes motor and opening/closing coils.	AC	48	ML	S47391	S33660
			100–130	MA	S47395	S33661
			220–240	MC	S47396	S33662
			380–415	MF	S47398	S33664
		DC	24–30	MO	S47390	S33659
			48–60	MV	S47391	S33660
			110–130	MR	S47392	S33661
			200–250	MS	S47393	S33662
	Communicating motor mechanism for electrically operated circuit breakers. Factory-installed includes motor and opening/closing coils.	AC	48	NL	S47391	S33034
			100–130	NA	S47395	S33035
			220–240	NC	S47396	S33036
			380–415	NF	S47398	S33038
		DC	24–30	NO	S47390	S33033
			48–60	NV	S47391	S33034
			110–130	NR	S47392	S33035
			200–250	NS	S47393	S33036

[5] Not available in H-frame 2P modules.
[6] Factory and field-installed standard motor operators for H- and J-frame circuit breakers require the SDE switch and SDE adapter (both included).
Factory and field-installed standard motor operators for L-frame circuit breakers require the SDE switch (included).
[7] Installation requires BSCM with NSX Cord. For ordering information see page 7-64 .

Rotary Handles



Direct-Mounted Rotary Handle



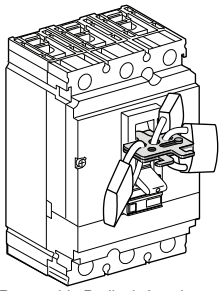
Door-Mounted Rotary Handle

Device		Description	B-Frame		H- and J-Frame *[8]*		L-Frame		P-Frame
			Factory Installed Cat. No. Suffix	Field-Installable Cat. No.	Factory Installed Cat. No. Suffix	Field-Installable Cat. No.	Factory Installed Cat. No. Suffix	Field-Installable Cat. No.	Factory Installed Cat. No. Suffix
Direct Mounted	Standard black handle	Operating mechanism kit	RD10	LV426930	RD10	S29337	RD10	S32597	RD10
	Standard black handle with	Two early-break and two early make switches	—	—	—	—	—	—	RD16
		One early-break switch	—	—	RD12	S29337 + S29345	RD12	S32597 + S32605	—
		Two early-make switches	—	—	RD13	S29337 + S29346	RD13	S32597 + S29346	—
	Red handle on yellow bezel	Operating mechanism kit	RD20	LV426931	RD20	S29339	RD20	S32599	—
		One early-break switch	—	—	RD22	S29339 + S29345	RD22	S32599 + S32605	—
		Two early-make switches	—	—	RD23	S29339 + S29346	RD23	S32599 + S29346	—
	MCC conversion accessory		—	—	—	S429341	—	S32606	—
	CNOMO conversion accessory		—	—	—	29342	—	S32602	—
Door Mounted	Standard black handle	Operating mechanism kit	—	LV426932	RE10	S29338	RE10	S32598	RE10
	Standard black handle with:	Two early-break and two early make switches	—	—	—	—	—	—	RE16
		Two early make switches	—	—	RE13	S29338 + S29346	RE13	S32598 + S29346	—
	Red handle on yellow bezel	Operating mechanism kit	—	LV426933	RE20	S29340	RE20	S32600	—
Rotary Handle Replacement Kit			—	—	—	—	—	—	S33875
Telescoping			—	—	RT10	S29343	RT10	S32603	—
Accessories	Key lock adapter		—	—	—	S429344	—	S32604	—
	Key locks	Ronis 1351.500	—	—	—	S41940	—	S41940	—
		Profalux KS5 B24 D4Z	—	—	—	S42888	—	S42888	—
		2 Ronis keylocks with 1 key	—	—	—	S41950	—	S41950	—
		2 Profalux keylocks with 1 key	—	—	—	S42878	—	S42878	—
	Indication Auxiliary Switch	One early-break switch	—	—	—	S29445	—	S32605	—
		Two early-make switches	—	—	—	S29346	—	S29346	—

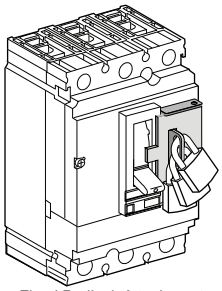
Refer to Digest Section 8—Operating Mechanisms for additional operating mechanism options.

[8] Not available in H-frame 2P modules.

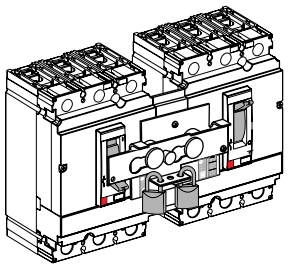
Locks, Installation Accessories, and Rear Connectors



Removable Padlock Attachment



Fixed Padlock Attachment



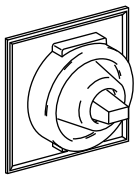
Interlocking with Toggle Control

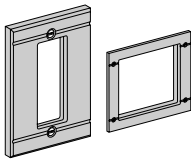
Table 7.101: Locks, Interlocking

Device	Description		B- Frame		H- and J- Frame		Q- Frame		L- Frame	M- and P- Frame		R- Frame	
			Factory-Installed Cat. No. Suffix	Field-Installable Cat. No.	Factory-Installed Cat. No. Suffix	Field-Installable Cat. No.	Factory-Installed Cat. No. Suffix	Field-Installed Cat. No.	Field-Installable Cat. No.	Factory-Installed Cat. No. Suffix	Field-Installable Cat. No.	Factory-Installed Cat. No. Suffix	Field-Installable Cat. No.
Handle Padlocking Device	Removable (lock OFF only)		—	S29370	—	S29370	—		S29370	—	S44936	—	S33996
	Fixed (lock OFF or ON)		YP	LV426905 LV426907 (I-Line)	YP	HJPA	YP	QBPA	S32631	YP	S32631	YP	S32631
	Fixed (lock OFF only)*[9]*		YQ	LV426906 LV426908 (I-Line)	YQ	HJPAF	YQ	QBPAF	NJPAF	YQ	MPRPAF	YQ	MPRPAF
	Fixed (lock OFF only)–2P		—	—	YQ	H2PHLA	YQ	—	—	—	—	—	—
Interlocking (Not UL listed)	Mechanical for circuit breakers with rotary handles *[10]*		—	—	—	S29369	—	—	S32621	—	S33890	—	—
	Mechanical for circuit breakers with toggles *[10]*		—	LV426909	—	S29354	—	QBMIK	S32614	—	—	—	—
Key Locking	Provision only, vertical mount, 1 or 2 locks	Kirk	—	—	—	—	—	—	—	JA	—		—
	Provisions only, vertical mounting one key interlock including padlock provision, open position only.	Kirk	—	—	—	—	—	—	—	JE *[11][12]*	—	JE *[12]*	—
	Provision only, horizontal mount 1 lock, M- and P-frame 1 or 2 locks, R-frame	Kirk	—	—	—	—	—	—	—	JK	—	JK	—
		Ronis	—	—	—	—	—	—	—	JB *[13]*	—	JB	—
		Profalux	—	—	—	—	—	—	—	JD *[13]*	—	JD	—
	Provision and 1 lock, vertical mount	Kirk	—	—	—	—	—	—	—	JG	—	—	—
	Provision and 1 lock, horizontal mount	Kirk	—	—	—	—	—	—	—	JL	—	JL	—
		Ronis	—	—	—	—	—	—	—	JC *[13]*	—	JC	—
		Profalux	—	—	—	—	—	—	—	JF *[13]*	—	JF	—
	Provision and 2 locks keyed alike	Kirk	—	—	—	—	—	—	—	JN	—	JN	—
	Provision and 2 locks keyed differently	Kirk	—	—	—	—	—	—	—	JP	—	JP	—

[9] Not available on HD and HG 2P modules.
[10] Not available in M frame or HD and HG 2P modules.
[11] Not available on M-frame.
[12] Not available on I-Line.
[13] Not available on M-frame or P-frame.


Phase Barriers

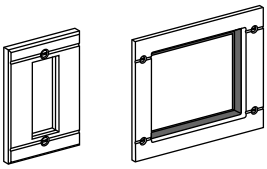

Handle Rubber Boot


Front Panel Escutcheons


DIN Rail Mounting Kit


Visi-Trip H-, J- Frame


Visi-Trip L- Frame


Door Escutcheon

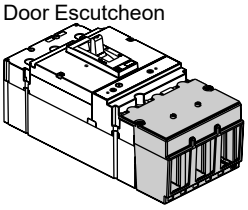

Terminal Covers

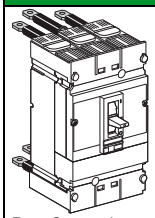
Table 7.102: Installation Accessories for B-, H-, J-, and L- Frame Circuit Breakers

Description	Field-Installable Cat. No.		
	B-Frame	H- and J- Frame	L- Frame
Front Panel Escutcheon for Toggle Breakers	—	S29315	32556
Front Panel Escutcheon for Rotary Handle, Motor Operator, or extended escutcheon	—	S29317	S32558
Phase Barriers (set of 6)	LV426920	S29329	32570
Handle Rubber Boot *[14]*	—	S29319	S32560
Sealing Accessories (for front cover screws)	S29375	S29375	S29375
DIN rail mounting kit (requires 15 mm depth on a 35 mm DIN rail) *[14]*	Standard	S29305	—
DIN rail adapter	Standard	—	—
Handle Extensions (set of 5)	—	S29313	S432553
Rear Insulation Kit (2P)	LV426921	—	—
Rear Insulation Kit (3P)	LV426922	—	—
Rear Insulation Kit (4P)	LV426923	—	—
Terminal Extensions-Spreaders (3P)	LV426940	—	—
Terminal Extensions-Spreaders (4P)	LV426941	—	—
5 N-m Torque Limiting Bit, Set of 6	LV426992	—	—
5 N-m Torque Limiting Bit, Set of 8	LV426993	—	—
9 N-m Torque Limiting Bit, Set of 6	LV426990	—	—
9 N-m Torque Limiting Bit, Set of 8	LV426991	—	—
Visi-Trip qty 1		VTRIPHJ	VTRIPL
Visi-Trip qty 5		VTRIPHJ05	VTRIPL05
Visi-Trip qty 10		VTRIPHJ10	VTRIPL10

Table 7.103: Installation Accessories for M-, P-, and R-Frame Circuit Breakers

Description		Frame	Field-Installable Cat. No.
Door Escutcheon	Accessory Cover	M-, P-Frame	S33718
		R-Frame	S33929
	Toggle Handle	M-, P-Frame	S33717
	Drawout	P-Frame	S33857
Terminal Covers	Short lug cover 3P	P-Frame	S33932
	Short lug cover 4P		S33933
	Long lug cover 3P		S33934
	Long lug cover 4P		S33935
Replacement Handle	Standard	R-Frame	S33997
	Standard Short	M-, P-Frame	S46998
	Long	M-, P-Frame	S46996

Table 7.104: H-, J-, and L-Frame Rear Connections

Device		Description	H-Frame				J-Frame				L-Frame			
			Poles	Factory-Installed Termination No.		Field-Installable Cat. No.	Poles	Factory-Installed Termination No.		Field-Installable Cat. No.	Poles	Factory-Installed Termination No.		Field-Installable Cat. No.
 Rear Connection	Mixed Rear Connection Kit *[15]*		2	S		—	2	S		—	3	S		S32477
			3	S		S37432	3	S		S37437	4	S		S32478
	Consisting of:	Short rear connections (set of 2)	2 or 3	—	2x	S37433	2 or 3	—	2x	S37438	3	—	2x	S432475
		Long rear connections (set of 2)		—		S37434		—		S37439 *[16]*		—	2x	S432476
		Short terminal cover (3P)	3	—		S37436	3	—		S37440	3	—	2x	S32562
		Short terminal cover (4P)	4	—		—	—	—		—	4	—	2x	S32563

[14] Not available in HD and HG 2P modules.
[15] Kit contains 4 short rear connections, 2 long rear connections (4 long rear connections for 4P), hardware, and 2 terminal covers.
[16] For use with 3P circuit breakers only.

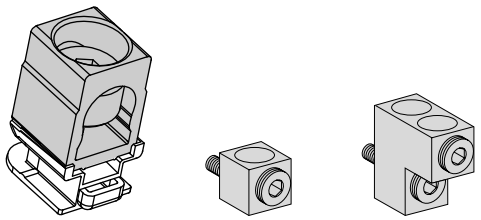
Mechanical Lugs

Table 7.105: Mechanical Lug Kits for B-Frame Circuit Breakers *[17]*

Description	Circuit Breaker Application			Ampere Rating	Number of Wires Per Lug and Wire Range	Factory-Installed Cat. Suffix	Field-Installable Cat. No.	Qty Per Kit
	Standard	Ampere Rating	Optional					
Al Lugs for Use with Al or Cu Wire			BD BG BJ	15-125 A	(1) 14-2/0 AWG Al or Cu	LH	LV426966	2
			BD BG BJ	15-125 A	(1) 14-2/0 AWG Al or Cu	LH	LV426967	3
Cu Lugs for Use with Cu Wire Only			BD BG BJ	15-125 A	(1) 14-1/0 AWG Cu	LC	LV426964	2
			BD BG BJ	15-125 A	(1) 14-1/0 AWG Cu	LC	LV426965	3
EverLink Lug	BD BG BJ (1P)	15 - 125 A			(1) 14-3/0 AWG Cu	—	—	—
	BD BG BJ (2P)	15 - 125 A			(1) 14-3/0 AWG Cu	—	—	—
	BD BG BJ (3P)	15 - 125 A			(1) 14-3/0 AWG Cu	—	—	—
	BD BG BJ (4P)	15 - 125 A			(1) 14-3/0 AWG Cu	—	—	—
EverLink Lug with Control Wire Terminal		15 - 125 A	BD BG BJ (2P)		(1) 14-3/0 AWG Cu	LU, LV, or LW *[18]*	LV426973	1
		15 - 125 A	BD BG BJ (3P)		(1) 14-3/0 AWG Cu	LU, LV, or LW *[18]*	LV426974	1
		15 - 125 A	BD BG BJ (4P)		(1) 14-3/0 AWG Cu	LU, LV, or LW *[18]*	LV426975	1

Table 7.106: Mechanical Lug Kits for H- and J-Frame Circuit Breakers *[17]*

Description	Circuit Breaker Application			Ampere Rating	Number of Wires Per Lug and Wire Range	Kit Cat. No.	Qty Per Kit
	Standard	Ampere Rating	Optional				
Al Lugs for Use with Al or Cu Wire	HD, HG, HJ, HL	15–150 A			(1) 14–3/0 AWG Al or Cu	AL150HD	3
	JD, JG, JJ, JL	150–175 A			(1) 4-4/0 AWG Al or Cu	AL175JD	3
	JD, JG, JJ, JL	200–250 A	JD,JG,JJ,JL	150–175 A	(1) 3/0–350 kcmil Al or Cu	AL250JD	3
Cu Lugs for Use with Cu Wire Only			HD,HG,HJ,HL	15–150 A	(1) 14–2/0 AWG Cu	CU150HD	3
			JD,JG,JJ,JL	150–250 A	(1) 1/0–300 kcmil Cu	CU250JD	3
Control Wire Terminal for H-frame lug kit						S37423	2
Control Wire Terminal for J-frame lug kit						S37424	2

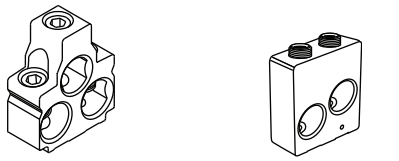


AL250JD
J-Frame Lug

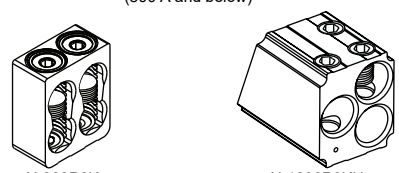
AL400L6IK3
AL600LS52K3
L-Frame Lug

Table 7.107: Mechanical Lug Kits for L-Frame Circuit Breakers *[19]*

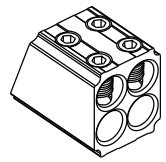
Description	Circuit Breaker Application				Number of Wires Per Lug and Wire Range	Kit Cat. No.	Qty Per Kit
	Ampere Rating	Poles	Unit Mount	I-Line			
Al Lugs for Use with Al or Cu Wire	250	3	X	X	(1) 2 AWG–500 kcmil Al (1) 2 AWG–600 kcmil Cu	AL400L61K3	3
		4	X	—		AL400L61K4	4
	400/600	3	X	—	(2) 2/0 AWG–500 kcmil Al or Cu	AL600LS52K3	3
		4	X	—		AL600LS52K4	4
	400/600	3	X	X	(2) 3/0 AWG–500 kcmil Al or Cu	AL600LF52K3	3
Cu Lugs for Use with Cu Wire Only	250	3	X	X	(1) 2 AWG–600 kcmil Cu	CU400L61K3	3
		4	X	—		CU400L61K4	4
	400/600	3	X	—	(2) 2/0 AWG–500 kcmil Cu	CU600LS52K3	3
		4	X	—		CU600LS52K4	4
	400/600	3	X	X	(2) 3/0 AWG–500 kcmil Cu	CU600LF52K3	3



AL800M23K
AL800P6K
M- and P-Frame Lugs
(800 A and below)



AL800P6K
AL1200P6KU



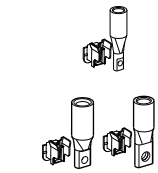
AL1200P25K
P-Frame Lugs (Above 800 A)

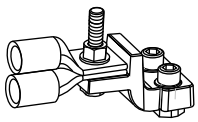
Table 7.108: Mechanical Lug Kits for M-, P- and R-Frame Circuit Breakers *[20]*

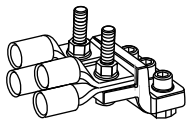
Description	Circuit Breaker Application				Wires per Lug and Wire Range	Cat. No.	Lugs Per Kit
	Standard	Rating	Optional	Rating			
Al Lugs for AL or Cu Wire	M-Frame, P-Frame	800 A	—	800 A	(3) 3/0 AWG-500 kcmil	AL800M23K	3
						AL800M23K4	4
		1200 A	MG, MJ, PG, PJ, PK, PL	800 A	(4) 3/0 AWG-500 kcmil	AL1200P24K *[21]*	1
		—	MG, MJ, PG, PJ, PK, PL	800 A	(2) 3/0 AWG-600 kcmil	AL800P6K *[21]*	3
						AL800P6K4 *[21]*	4
		—	MG, MJ, PG, PJ, PK, PL	800 A	(2) 3/0 AWG-750 kcmil 750 kcmil: compact AL only	AL800P7K *[21]*	3
						AL800P7K4 *[21]*	4
	P-Frame	1200 A	PG, PJ, PK, PL	800 A	(4) 3/0 AWG-500 kcmil	AL1200P25K *[22]*	3
						AL1200P25K4 *[22]*	4
		—	PG, PJ, PK, PL	800–1200 A	(3) 350-600 kcmil	AL1200P6KU *[22]*	3
						AL1200P6KU4 *[22]*	4
	PG,PJ,PL	—	PG, PJ, PK, PL	1200 A	(3) 3/0 AWG-750 kcmil 750 kcmil: compact AL only	AL1200P7KU *[22]*	3
						AL1200P7KU4 *[22]*	4
	R-Frame	1200 A	I-Line	—	(4) 3/0 AWG-600 kcmil	AL1200R53K	1
		2500 A	Unit Mount	—	(1) 3/0 AWG-750 kcmil	AL2500RK *[23]*	2
Cu Lugs for Cu Wire Only*[24]*	M-Frame, P-Frame	—	PJ	100–150 A	(1) 1-1/0 AWG	CU250P1K *[25]*	3
		800 A	MG, MJ, PG, PJ, PK, PL	—	(3) 3/0 AWG-500 kcmil	CU800M23K	3
						CU800M23K4	4
		1200 A	MG, MJ, PG, PJ, PK, PL	800–1200 A	(4) 3/0 AWG-500 kcmil	CU1200P24K *[21]*	1
	P-Frame	1200 A	PG, PJ, PK, PL	800–1200 A	(4) 3/0 AWG-500 kcmil	CU1200P25K *[22]*	3
						CU1200P25K4	4
	R-Frame	1200 A	I-Line	—	(4) 3/0 AWG-500 kcmil	CU1200R53K	1

[17] For terminal nuts/bus bar connections see page 7-59.
[18] LU = ON end only, LV = OFF end only, LW = BOTH ends
[19] Lug kits for Legacy L-frame circuit breakers can be found in Supplemental Digest Section 11 (i.e. LA, LH circuit breakers).
[20] For lug with a tapped hole for control wire, add a "T" before the "K" in the catalog number (for example, AL800P6TK).
[21] Does not fit onto ON end of unit-mount P-frame circuit breakers.
[22] For unit-mount circuit breaker only.
[23] All unit-mount R-frame circuit breakers require terminal pads for mounting lugs of any type.
[24] Not available with tapped hole for control wire.
[25] This lug can only be used on low amp PJ frame breakers where the Instantaneous setting must not be turned OFF. The cables must be laced with rope per lug instructions.

Compression Lugs


J-Frame Compression Lug


P-Frame Compression Lug Kit


R-Frame Compression Lug Kit

A = Crimp lugs or PDC connectors extension past end of circuit breaker

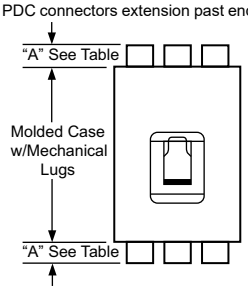


Table 7.109: Compression Lug Kits for PowerPacT™ Circuit Breakers

Description	Circuit Breaker Type	Ampere Rating	System Range	Mounting Type	Dimension A (in)	Max. Lugs per Terminal	Cat. No.	Qty. Per Kit
Compression Lug Kits for B-Frame Circuit Breakers								
Aluminum Compression Lug Kits	B-frame	125 A	8-1/0 AWG Al or Cu	Unit/I-line *[26]*	1.3	1	LV426988	2
		125 A	8-1/0 AWG Al or Cu		1.3	1	LV426989	3
Copper Compression Lug Kits	B-frame	125 A	6-1/0 AWG Cu		1.4	1	LV426986	2
		125 A	6-1/0 AWG Cu		1.4	1	LV426987	3
Compression Lug Kits for H-Frame and J-Frame Circuit Breakers								
Aluminum Compression Lug Kits	H-frame	60 A	6–2 AWG Al or Cu	Unit/I-line *[26]*	1.2	1	YA060HD	3
		150 A	1/0–4/0 AWG Al or Cu		2.5	1	YA150HD	3
	J-frame	150 A	1–3/0 AWG Al or Cu		1.2	1	YA150JD	3
		250 A	3/0–350 kcmil Al or Cu		2.5	1	YA250J35	3
Copper Compression Lug Kits	H-frame	60 A	6–1/0 AWG Cu		1.0	1	CYA060HD	3
		150 A	4–2/0 AWG Cu		1.2	1	CYA150HD	3
	J-frame	150 A	6–1/0 AWG Cu		0.7	1	CYA150JD	3
		250 A	2/0–300 kcmil Cu		1.1	1	CYA250J3	3
Compression Lug Kits for L-Frame Circuit Breakers								
Aluminum Compression Lug Kits	L-frame	250 A	4-300 kcmil Al/Cu	Unit/I-line *[26]*	1.2	1	YA400L31K3	3
		400 A	4-300 kcmil Al/Cu		2.5	2	YA600L32K3	6
		250 A	2/0-500 kcmil Al/Cu			1	YA400L51K3	3
		600 A	2/0-500 kcmil Al/Cu			2	YA600L52K3	6
		400 A	500-750 kcmil Al 500 kcmil Cu			1	YA400L71K3	3
		250 A	4-300 kcmil Al/Cu			1	YA400L31K4	4
		400 A	4-300 kcmil Al/Cu			2	YA600L32K4	8
		250 A	2/0-500 kcmil Al/Cu			1	YA400L51K4	4
		600 A	2/0-500 kcmil Al/Cu		1.2	2	YA600L52K4	8
		400 A	500-750 kcmil Al 500 kcmil Cu		2.5	1	YA400L71K4	4
Copper Compression Lug Kits	L-frame	250 A	2/0-300 kcmil Cu	Unit/I-line *[26]*	1.2	1	CYA400L31K3	3
		400 A	2/0-300 kcmil Cu		2.5	2	CYA600L32K3	6
		250 A	250-500 kcmil Cu			1	CYA400L51K3	3
		600 A	250-500 kcmil Cu			2	CYA600L52K3	6
		250 A	2/0-300 kcmil Cu			1	CYA400L31K4	4
		400 A	2/0-300 kcmil Cu			2	CYA600L32K4	8
		250 A	250-500 kcmil Cu			1	CYA400L51K4	4
		600 A	250-500 kcmil Cu			2	CYA600L52K4	8
Compression Lug Kits for M-Frame, P-Frame, and R-Frame Circuit Breakers								
Aluminum Compression Lug Kits	M-, P-frame	250 A	2/0-300 kcmil	Unit/I-line *[26]*	3.7	2	YA250P3	1
		300 A	4/0-500 kcmil		3.9	2	YA300P5	1
		400 A	2/0-300 kcmil		4.3	2	YA400P3	2
		400 A	500-750 kcmil Al, 500 kcmil Cu		3.7	2	YA400P7	1
		600 A	4/0-500 kcmil		3.9	2	YA600P5	2
		800 A	500-750 kcmil Al, 500 kcmil Cu		4.3	2	YA800P7	2
	R-frame *[27]*	1200 A	2/0-300 kcmil	I-line *[26]*	3.8	4	YA1200R3	4
		1200 A	4/0-500 kcmil		4.0	4	YA1200R5	4
		1200 A	500-750 kcmil Al, 500 kcmil Cu		4.4	4	YA1200R7	4
		2000 A	2/0-300 kcmil	Unit *[26]*	— *[27]*	8	YA2000R3	2
		2000 A	4/0-500 kcmil		— *[27]*	8	YA2000R5	2
		2500 A	500-750 kcmil		— *[27]*	8 *[28]*	YA2500R7	2
Copper Compression Lug Kits	M-, P-frame	400 A	4/0-500 kcmil	Unit *[26]*	3.3	2	CYA400P5	1
		600 A	4/0-500 kcmil		3.3	2	CYA600P5	2
		800 A	500-750 kcmil		3.6	2	CYA800P7	2
	R-frame	1200 A	4/0-500 kcmil	I-Line *[26]*	3.5	4	CYA1200R5	4
		1200 A	500-750 kcmil		3.8	4	CYA1200R7	4

[26] Not for use on I-Line™ circuit breakers unless wire bending space is adequate.
[27] All unit-mount R-frame circuit breakers require terminal pads for mounting lugs of any type.
[28] 9 lugs for 3000 A circuit breakers

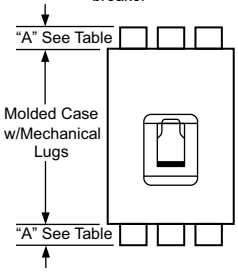

PDC6HD6

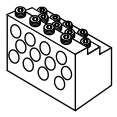

PDC6JD4

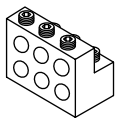

PDC3HD2


PDC3JD20

Crimp lugs or PDC connectors extension "A" past end of circuit breaker




PDC12P4


PDC6P20

Power Distribution Connectors

Power distribution connectors (PDCs) can be used for multiple load wire connections on one circuit breaker in place of standard distribution block to save space and time.

The connectors are attached to circuit breaker terminals equipped with separately provided terminal nut connectors. *[29]*

Applications:

- For use on load end of circuit breaker only
- For use in UL 508 Industrial Control applications
- For use in UL 1995/CSA C22.2 No. 236 heating and cooling equipment
- For copper wire only

Table 7.110: Power Distribution Connectors for B-Frame, H-Frame, J-Frame and L-Frame Circuit Breakers *[30]*

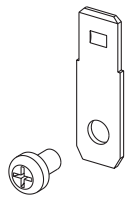
Use with Circuit Breaker Type	Ampere Rating	(Wires Per Terminal) Wire Range	Dimension A (in.)	Cat. No.	Qty. Per Kit	Kit Contents
BD, BG, BJ	125 A	(3) 14 - 2 AWG	1.2	PDC3BD2	3	Mounting hardware, lugs
	125 A	(6) 14 - 6 AWG	1	PDC6BD6	3	
HD, HG, HJ, HL *[31]*	15–150 A	(6) 14–6 AWG Cu	1.0	PDC6HD6	3	Mounting hardware, lugs, special purpose label and instructions
	15–150 A	(3) 14–2 AWG Cu	1.2	PDC3HD2	3	
JD, JG, JJ, JL *[31]*	150–250 A	(6) 14–4 AWG Cu	1.0	PDC6JD4	3	
	150–250 A	(2) 14–1 AWG and (1) 3–2/0 AWG Cu	1.5	PDC3JD20	3	
LD, LG, LJ, LL *[32]*	150–600 A	(3) 14–1 AWG and (2) 3–2/0 AWG	1.28	PDC5DG20L3	3	Mounting hardware, lugs, special purpose label, Medium Terminal Shield and instructions
	150–600 A	(12) 14–4 AWG	1.31	PDC12DG4L3	3	Mounting hardware, lugs, special purpose label, Long Terminal Shield and instructions

Table 7.111: Power Distribution Connectors for M-Frame and P-Frame Circuit Breakers *[30]*

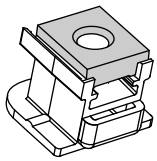
	Ampere Rating	(Wires Per Terminal) Wire Range	Cat. No.	Qty Per Kit	Kit Contents
Use for multiple load connections on one circuit breaker in place of standard distribution block to save space and time. • Use on load end of circuit breaker only • Use in UL508 Industrial Control applications only. • Use in UL1995/CSA C22.2 No. 236 heating and cooling equipment. • For Cu wire only.	250–1200 A	(6) 12–2/0 AWG Cu	PDC6P20	3	Mounting hardware, lugs, special purpose label and instructions
		(6) 12–2/0 AWG Cu	PDC6P204	4	Mounting hardware, lugs, special purpose label and instructions
	250–1200 A	(12) 10–4 AWG Cu	PDC12P4	3	Mounting hardware, lugs, special purpose label and instructions
			PDC12P44	4	Mounting hardware, lugs, special purpose label and instructions

[29] Refer to Terminal Shields and Phase Barriers.
[30] Not for use with I-Line™ circuit breakers.
[31] Special Purpose—Not for General Use. Use on ON end of the circuit breaker only when ON end is used as Load end. Use on OFF end of the circuit breaker only when OFF end is used as Load end.
[32] Kit includes long terminal shield and cover, which adds 1.65 inches to standard lug with short terminal shield.

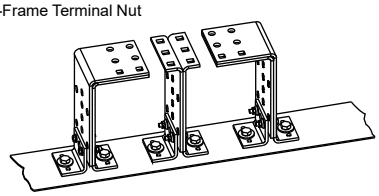
H-Frame Lug with Terminal Nut Insert



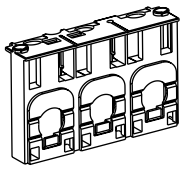
Control Wire Terminal for J-Frame Terminal Nut



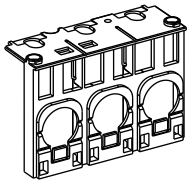
Terminal Nut Insert



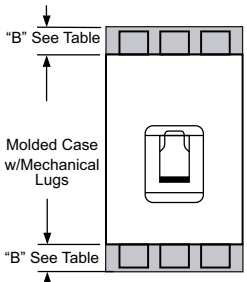
RLTB Terminal Pad Kit

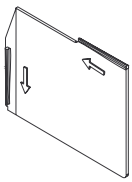


H-Frame Short Lug Shield



J-Frame Short Lug Shield





R-Frame Phase Barrier

Terminal Accessories

Table 7.112: Terminal Nuts for Bus Bar Connection of B-, H- and J-Frame Circuit Breakers

Description	Frame	Tap	Cat. No.	Qty Per Kit
B-Frame Terminal Nut Insert-Metric	BD/BG/BJ (2P)	M6	LV426962	2
B-Frame Terminal Nut Insert-Metric	BD/BG/BJ (3P)	M6	LV426963	3
H-Frame Terminal Nut Insert–English	HD/HG/HJ/HL	1/4-20	S37425	2
H-Frame Terminal Nut Insert–English	HD/HG/HJ/HL	1/4-20	S37444	3
H-Frame Terminal Nut Insert–Metric	HD/HG/HJ/HL	M6	S37426	2
J-Frame Terminal Nut Insert–English	JD/JG/JJ/JL	1/4-20	S37427	2
J-Frame Terminal Nut Insert–English	JD/JG/JJ/JL	1/4-20	S37445	3
J-Frame Terminal Nut Insert–Metric	JD/JG/JJ/JL	M8	S37428	2
Control Wire Terminal for H-Frame Terminal Nut	HD/HG/HJ/HL	—	S37429	2
Control Wire Terminal for J-Frame Terminal Nut	JD/JG/JJ/JL	—	S37430	2

Table 7.113: Bus Bar Connections Hardware for L-, M-, and P-Frame Circuit Breakers

Frame	Description	Term. No.	Poles	Cat. No.
L-Frame	Set of 4 terminal screws and washers for one side	F	4	S36967
M- and P-Frame	Bus Connector Kit for one pole, one end	—	1	S33928

Table 7.114: Terminal Pad Kits for R-Frame Circuit Breakers

R-Frame Circuit Breaker	Terminal Pad Kit		Field-Installable Kits	
	Usage	Lugs per Phase	3P Kit (One End Only) Cat. No.	4P Kit (One End Only) Cat. No.
3000 A, 100% Rated *[33]*	Required for cable or bus	9	RL3TB	RL3TB4
3000 A, Standard (80% Rated) *[34]*	Required for cable or bus			
2500 A, 100% Rated	Required for cable or bus	8	RLTB	RLTB4
2500 A, Standard (80% Rated)	Required for cable, optional for bus			
All Other R-Frame Circuit Breakers	Required for cable, optional for bus			
For cable connection to RLTB, use AL2500RK lug. See page 7-57.				

Table 7.115: Terminal Shields and Phase Barriers

Used With	Description				Dimension B (in.)	Cat. No.	Qty Per Kit
H- and J-Frame Mechanical Lugs	Short Lug Shield *[35]*	Frame	Max. Wire Size				
		H-Frame 60 A	3 AWG		0.50	S37446	1
		H-Frame 150 A	3/0 AWG		0.50	S37447	1
		J-Frame	350 kcmil		0.24	S37448	1
B-, H- and J-Frame Power Distribution Connectors and Compression Lugs		Compatible with:					
		PDC	Compression Lugs				
			Aluminum	Copper			
	B-Frame Long Lug Shield	PDC3BD2	L-V426988	LV426986	1.9	LV426911 (2P) LV426912 (3P) LV426913 (4P)	1
		PDC6BD6	L-V426989	LV426987			
	H-Frame Long Lug Shield	PDC6HD6	YA060HD	CYA060HD	2.24	S37449	1
		PDC3HD2	YA150HD	CYA150HD			
	J-Frame Long Lug Shield	PDC6JD4	YA150JD	CYA150JD	1.68	S37450	1
		PDC3JD2	*[36]*	CYA250J3			
L-Frame	3P Short Terminal Shield					LTSS3P	1
	3P Medium Terminal Shield					LTSM3P	1
	3P Long Terminal Shield					LTSL3P	1
	4P Medium Terminal Shield					LTSM4P	1
	4P Long Terminal Shield					LTSL4P	1
M-, P-Frame	Phase Barriers					S33646	3
R-Frame						S33998	

Table 7.116: Miscellaneous H-, J-, and L-Frame Circuit Breaker Accessories

Accessory	Description	Field-Installable Cat. No.
Spare Parts	Bag of screws for accessory cover, L-frame	S432552
	1 spare toggle extension, L-frame	32595
	Set of 10 identification labels	LV429226

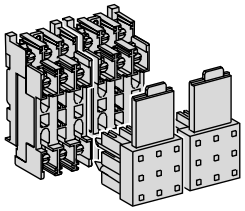
[33] 3000 A 80% and 100% rated RL3TP (3P) and RL3TP4 (4P) ship with 2 kits.
[34] 2500 A 80% and 100% rated RLTB (3P) and RLTB4 (4P) ship with 2 kits.
[35] Short lug shields provide IP20 protection for mechanical lugs and are compatible with control wire terminals.
[36] J-frame terminal shield is not compatible with the YA250J35 compression terminal.

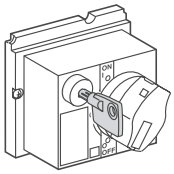

H- and J-Frame
Plug-In Mounting


H- and J-Frame
Drawout Mounting


L-Frame
Plug-In Mounting


L-Frame
Drawout Mounting


L-Frame Disconnecting Blocks


L-Frame Locking Device

Mountings

Table 7.117: Plug-In and Drawout Mountings for H- and J-Frame Circuit Breakers (3P or 2P in a 3P module)

Description			Factory Installed Cat. No.	Field-Installable Cat. No.
Complete Factory-Assembled Circuit Breakers	Plug-in base shipped with circuit breaker		N	—
	Drawout cradle shipped with circuit breaker		D	—
Special Order Options for Plug-In and Drawout Circuit Breakers	Plug-In Base	Circuit breaker Only	HJ00	—
		Plug-in base kit	—	S29278
	Drawout Cradle	Circuit breaker only	HJ00	—
		Plug-in base kit	—	S29278
		Cradle side plates (fixed part of chassis)	—	S29282
		Circuit breaker side plates (moving part of chassis)	—	S29283
Accessories for Plug-In and Drawout	H-Frame Shutter Kit (set of two)		—	S37442
	J-Frame Shutter Kit (set of two)		—	S37443
	Secondary Disconnect Blocks	Fixed part 9-wire connector (mounted on base)	—	S29273
		Moving part 9-wire connector (mounted on circuit breaker)	—	S29274
		Support for 2-moving connectors	—	S29275
	Extended escutcheon with extended toggle handle		—	S29284
	Two position indicating switches (connected/disconnected)		—	S29287
	H-Frame Short Terminal Cover (3P		—	S37436
	J-Frame Short Terminal Cover (3P)		—	S37440

Table 7.118: Plug-In and Drawout Mountings for L-Frame Circuit Breakers

Description		Poles	Plug-in Mounting		Drawout Mounting	
			Factory-Installed Cat. No.	Field-Installed Cat. No.	Factory-Installed Cat. No.	Field-Installable Cat. No.
Kit (stationary and moving parts)		3	N	—	D	—
		4	N	—	D	—
Stationary Part	Plug-in base	3	—	S32514	—	S32514
		4	—	S32515	—	S32515
	Fixed part of chassis		—	—	—	S32532
Moving Part	Circuit breaker only		HJ00	—	HJ00	—
	Moving part of chassis		—	—	—	S32533
	Short terminal covers	3	—	2x S32562	—	2x S32562
		4	—	2x S32563	—	2x S32563

Table 7.119: Plug-In and Drawout Accessories for L-Frame Circuit Breakers

Description			Field-Installable Cat. No.
Secondary Disconnecting Blocks	Fixed Part	9-wire connector	S29273
	Moving Part	9-wire connector	S32523
		Support for 3 moving connectors	S32525
	Fixed + Moving	9-wire manual auxiliary connector	S29272
Shutters	Two shutters for plug-in base		32521
Chassis Accessories	Extended escutcheon for toggle		S32534
	Locking device (key lock is not included)		S29286
	Two position indicating switches (connected/disconnected)		S29287

Table 7.120: Termination Options

Termination Letter	Termination No.
N = Plug-in	L G L 3 6 4 0 0 U 3 1 X For factory-installed termination, place termination letter in the third block of the circuit breaker catalog number.
D = Drawout	

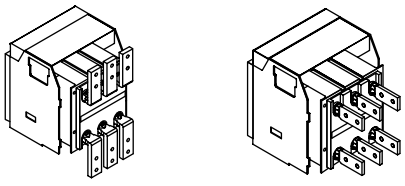
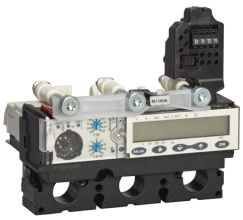

P-Frame Drawout Cradle Connections

Table 7.121: Drawout Cradle and Accessories for P-Frame Circuit Breakers

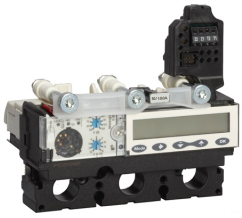
Description		Cat. No.
Drawout Cradle		Product Selector
Cradle Connectors	Front Connected Flat (FCF)	SFCF12 *[37]*
	Rear Connected T Horizontal/Vertical (RCTH/RCTV)	SRCTV12 *[37]*
Cradle Accessories	Modbus™ cradle communication module	S33852
	Safety shutters	S48933
	Secondary disconnects terminal shield	S33763
	Cradle position switch 1a/1b Form C— Connected/test/disconnected	S33170
	Low level cradle position switch 1a/1b Form C—Connected/test/disconnected	S33171
	Cell keying kit	S33767
	Disconnected position key locking—provision for Kirk or Federal Pioneer Lock	S33772
	Door interlock kit	S33786
	Racking interior kit	S33788
	Door escutcheon (for replacement only, included with circuit breaker)	S33857
	Transparent cover	S33859
	Push-in terminal kit (3 wires)	S33098
	Push-in terminal kit (6 wires)	S33099
	Finger cluster	S33166
	Cluster grease (12 oz. tube)	S48899

[37] Needs 2 kits per cradle.

PowerPacT H-, J-, and L-Frame MicroLogic Trip Units



MicroLogic Standard Trip Unit



MicroLogic Ammeter and Energy Trip Unit

MicroLogic Trip Units *[1]*

MicroLogic Standard 3.2/3.3 Trip Units

PowerPacT™ H-, J-, and L-frame molded case circuit breakers may be specified with any of the following MicroLogic Electronic Trip Units.

- True RMS sensing
- LI, LSI trip configurations
- Field-interchangeable trip units
- LED long-time pickup and trip indication
- Test kits available
- Thermal imaging

MicroLogic Ammeter 5.2A/5.3A/6.2A/6.3A Trip Units

Includes all features listed for MicroLogic standard trip unit, as well as:

- Advanced user interface
- Neutral protection
- Incremental fine tuning of settings
- Up to 12 alarms
- Digital ammeter—phase and neutral (4-pole only)
- Phase loading bar graph
- Maintenance indicators including contact wear, number of operations, operating hours, and load profiles
- Cause of trip information for troubleshooting assistance
- LCD Display
- Zone-selective interlocking (ZSI) (short-time & ground-fault)
- Optional Modbus™ communications—PowerLogic™ compatible

MicroLogic Energy 5.2E/5.3E/6.2E/6.3E Trip Units

Includes all features listed for MicroLogic ammeter trip unit, as well as:

- Ground-fault trip with programmable ground fault alarm (available on 6.2E/6.3E only)
- Power and energy measurement
- Power quality measurements
- Current demand and power demand measurements

PowerPacT H, J and L-Frame MicroLogic Trip Units

Table 7.122: MicroLogic Trip Unit Settings for H-, J-, and L-Frame

Model	Trip Function	Trip Unit	Ampere Setting
MicroLogic Trip Unit Settings for H- and J-Frame Circuit Breakers			
Standard	LI	3.2	15-20-25-30-35-40-45-50-60
			35-40-45-50-60-70-80-90-100
			50-60-70-80-90-100-110-125-150
			70-80-100-125-150-175-200-225-250
	LSI	3.2S	15-20-25-30-35-40-45-50-60
			35-40-45-50-60-70-80-90-100
			50-60-70-80-90-100-110-125-150
			70-80-100-125-150-175-200-225-250
Ammeter	LSI	5.2A	15–60
			35–100
			50–150
			70–250
	LSIG	6.2A	15–60
			35–100
			50–150
			70–250
Energy	LSI	5.2E	15–60
			35–100
			50–150
			70–250
	LSIG	6.2E	15–60
			35–100
			50–150
			70–250
MicroLogic Trip Unit Settings for L-Frame Circuit Breakers			
Standard	LI	3.3	70-80-100-125-150-175-200-225-250
			125-150-175-200-225-250-300-350-400
			200-225-250-300-350-400-450-500-600
	LSI	3.3S	70-80-100-125-150-175-200-225-250
			125-150-175-200-225-250-300-350-400
			200-225-250-300-350-400-450-500-600
Ammeter	LSI	5.3A	125–400
			200–600
	LSIG	6.3A	125–400
			200–600
Energy	LSI	5.3E	125–400
			200–600
	LSIG	6.3E	125–400
			200–600

[1] See Supplemental Digest Section 3 for circuit breakers with field-interchangeable trip units.

PowerPacT P- and R-Frame MicroLogic Trip Units

PowerPacT P- and R-Frame MicroLogic Trip Units

Standard Trip Unit | Ammeter Trip Unit | Power Trip Unit | Harmonic Trip Unit | Adjustable Rating Plug

MicroLogic (Standard) 3.0 and 5.0 Trip Units

PowerPacT™ P- and R-frame molded case circuit breakers may be specified with any of the following MicroLogic Electronic Trip Units.

- True RMS sensing
- LI, LSI trip configurations
- Field-interchangeable long-time rating plugs
- LED long-time pickup indication
- Test kits available
- Thermal imaging

MicroLogic (Ammeter) 3.0A, 5.0A and 6.0A Trip Units

Includes all features listed for MicroLogic standard trip unit, as well as:

- LSIG trip configurations
- Digital ammeter—phase and neutral (4-pole only)
- Phase loading bar graph
- LED trip indication
- Zone-selective interlocking (ZSI) (short-time & ground-fault)
- Optional Modbus™ communications—PowerLogic™ compatible

MicroLogic (Power) 5.0P and 6.0P Trip Units

Power measurement and advanced protection features includes all features listed for MicroLogic ammeter trip unit, as well as:

- LSI trip configuration with programmable ground fault alarm
- LSIG (Ground-fault trip) with programmable ground fault alarm
- Incremental “fine tuning” of L, S, I, and G pickup and delay settings
- LCD dot matrix display and LED trip indication
- Advanced user interface
- Advanced protection IDMTL—selectable long-time delay bands
- Neutral protection
- Power measurement
- Contact wear indication
- Modbus communications—PowerLogic compatible
- Local and remote settings

MicroLogic (Harmonic) 5.0H and 6.0H Trip Units

Power quality measurement and advanced protection features. Includes all features listed for the MicroLogic power trip unit, as well as:

- Enhanced power measurements functions
- Power quality measurements

Adjustable Rating Plugs for PowerPacT™ P-Frame and R-Frame and MasterPacT™ NT and NW Circuit Breakers—Selection

To provide maximum design flexibility, system protection, and field upgradeability, each MicroLogic™ trip unit is equipped with an interchangeable long-time rating plug. Each trip unit requires an adjustable rating plug to determine the long-time pickup range of the circuit breaker. These plugs are factory installed on new trip units, or can be ordered separately for field-installable upgrades.

Adjustable rating plugs are offered in eight different ranges of long-time pickup adjustments. The following chart show the ranges of adjustments. Each adjustment times the sensor rating (Ir x In) of the circuit breaker sets the long-time pickup value of the circuit breaker.

Table 7.123: PowerPacT P- and R-Frame MicroLogic Trip Unit and Options

Model	Protection	Additional Features	Field-Installable Cat. No. *[2]*
2.0 (IEC only)	LSO	None	S132R
3.0 (UL/ANSI only)	LI		S131A
5.0	LSI		S133A
2.0A (IEC only)	LSO	Ammeter	S142R *[3]*
3.0A (UL/ANSI only)	LI		S141A *[3]*
5.0A	LSI		S143A *[3]*
6.0A	LSIG		S144A *[3]*
5.0P	LSI	Metering, Adv. Protection	S163A *[3][4]*
6.0P	LSIG		S164A *[3][4]*
5.0H	LSI	Metering, Adv. Protection & Harmonic Analysis	S173A *[3][4]*
6.0H	LSIG		S174A *[3][4]*

Table 7.124: PowerPacT P- and R-Frame MicroLogic Trip Units

x– Standard Feature o – Available Option

Features	Standard		Ammeter			Power		Harmonic	
	3.0	5.0	3.0A	5.0A	6.0A	5.0P	6.0P	5.0H	6.0H
LI	X	—	X	—	—	—	—	—	—
LSI (Instantaneous can be turned off)	—	X	—	X	X	X	X	X	X
LSIG / Ground-Fault Trip *[5]*	—	—	—	—	X	—	X	—	X
Ground-Fault Alarm (No Trip) *[5][6]*	—	—	—	—	—	X	—	X	—
Ground-Fault Alarm and Trip *[5][6]*	—	—	—	—	—	—	X	—	X
Adjustable Rating Plugs	X	X	X	X	X	X	X	X	X
True RMS Sensing	X	X	X	X	X	X	X	X	X
UL Listed	X	X	X	X	X	X	X	X	X
Thermal Imaging	X	X	X	X	X	X	X	X	X
Phase Loading Bar Graph	—	—	X	X	X	X	X	X	X
LED for Long-time Pickup	X	X	X	X	X	X	X	X	X
LED for Trip Indication	—	—	X	X	X	X	X	X	X
Digital Ammeter	—	—	X	X	X	X	X	X	X
Zone-selective Interlocking	—	—	X	X	X	X	X	X	X
Communications	—	—	X	X	X	X	X	X	X
LCD Dot Matrix Display	—	—	—	—	—	X	X	X	X
Advanced User Interface	—	—	—	—	—	X	X	X	X
Protective Relay Functions	—	—	—	—	—	X	X	X	X
Neutral Protection	—	—	—	—	—	X	X	X	X
Contact Wear Indication	—	—	—	—	—	X	X	X	X
Incremental Fine Tuning of Settings	—	—	—	—	—	X	X	X	X
Selectable Long-time Delay Bands	—	—	—	—	—	X	X	X	X
Power Measurement	—	—	—	—	—	X	X	X	X
Power Quality Measurements	—	—	—	—	—	—	—	X	X
Waveform Capture	—	—	—	—	—	—	—	X	X

Table 7.125: PowerPacT P- and R-Frame Long-Time Pickup Settings

Rating Plug	Long-time Pickup Settings								
A	.40	.45	.50	.60	.63	.70	.80	.90	1.0
B	.40	.44	.50	.56	.63	.75	.88	.95	1.0
C	.42	.50	.53	.58	.67	.75	.83	.95	1.0
D	.40	.48	.64	.70	.80	.90	.93	.95	1.0
E	.60	.70	.75	.80	.85	.90	.93	.95	1.0
F	.84	.86	.88	.90	.92	.94	.96	.98	1.0
G	.66	.68	.70	.72	.74	.76	.78	.80	.82
H	.48	.50	.52	.54	.56	.58	.60	.62	.64

Table 7.126: Special Options

Description	Factory-Installed Suffix	Field-Installable Cat. No.
Ship circuit breaker in closed position	YK	N/A
CT Characterization (Calibrated trip system)	Q	N/A
Alternate Maintenenace Setting (AMS) kit (use with 5.0/6.0 A, P or H and 5.3/6.3 A or E MicroLogic trip units)	—	84957
Energy Reduction Maintenenace Setting (ERMS) kit (use with 5.0/6.0 P or H MicroLogic trip units)	—	84956
Maintenance Mode Setting Switch kit	120 Vac	LV429659
	24 Vdc	LV429658

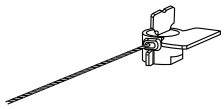
[2] The standard rating plug supplied with a trip unit will be the “A” rating plug. To specify an alternative adjustable rating plug, please add the letter designation to the end of the catalog number. Please refer to page 7-64 for a complete listing of adjustable settings available with each plug. (Example: S143B would specify a “B” rating plug instead of the standard "A" plug.) Use suffix “N” if no rating plug is required, deduct.

[3] When replacing a standard trip unit with Type A (Ammeter), P (Power metering) or H (Harmonic analysis) trip unit, order the 12-pin connector kit S33101 for the MasterPacT NW and NT and the PowerPacT P-frame drawout circuit breakers or kit S33100 for PowerPacT P-frame and R-frame unit-mount and I-Line circuit breakers.

[4] Requires Circuit Breaker Communications Module.

[5] Requires neutral current transformer in 3Ø4W systems.

[6] Alarm history is available through the trip unit display and communications. Local indication of an alarm requires an M2C Programmable Contact Module.



Trip Unit Seal

Sensor Plug

Trip Unit Accessories

Adjustable rating plug "A" is installed as standard on all MicroLogic trip unit orders. However, an alternative selection may be specified from the "Assembled" table below, and factory installed with your trip unit order at no additional charge. To order, please attach the appropriate catalog suffix to the end of the trip unit Cat. No. (after specifying trip unit options). Adjustable rating plugs may also be purchased as field-installable components from the table below.

For Enerlin'X accessory information, see Enerlin'X Digital Solutions, page 7-77

Table 7.127: Rating Plugs

Rating Plug *[7]*	Factory Installed Cat. Suffix	Field-Installable Cat. No.
A	A (standard)	S48818
B	B	S48819
C	C	S48820
D	D	S48836
E	E	S48837
F	F	S48838
G	G	S48839
H	H	S48840

Table 7.128: Neutral Current Transformers

Use With	Cat. No.	Sensor
H- Frame	S429521	60–100
	S430562	150
J- Frame	S430563	250
L- Frame	S432575	400–600
P- Frame	S33575 *[8]*	250
	S33576 *[8]*	400–1600
R- Frame	S48916 *[8]*	250
	S34036 *[8]*	400–1600
	S48896 *[8]*	2000
	S48182 *[8]*	3000
All	NCTWIRING	All

Table 7.129: Zone-Selective Interlocking

Description	Factory-Installed Cat. Suffix	Field-Installable Cat. No.
ZSI Interface Module	—	S434212
24 Vdc Terminal Block	EN	S434210
ZSI Wire Harness, H/J Frame	YH3	S434300
ZSI Wire Harness, L- Frame	YH3	S434301
ENCT & ZSI Wire Harness	YH4	—

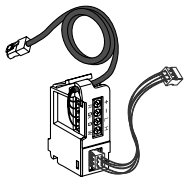
Table 7.130: Trip Unit Accessories

Device		Frame	Cat. No.
Pocket Tester		H/J/L	S434206
MicroLogic 5/6 Cover, Transparent		H/J	S429478
MicroLogic 2/3 Cover, Transparent			S429481
MicroLogic 5/6 Cover, Transparent		L	S432459
MicroLogic 2/3 Cover, Transparent			S432461
LCD Display for MicroLogic 5		H/J/L	S429483
LCD Display for MicroLogic 6			S429484
Service Interface Kit *[9]*		H/J/L/P/R	LV485500
Trip Unit Battery for Trip Indicator Lights		P/R	S33593
Power supply with:	24–30 Vdc input		LV454440
	48/60 Vdc input		LV454441
	125 Vdc input		LV454442
	110–130 Vac input		LV454443
	200–240 Vac input		LV454444
MicroLogic A Trip Unit Cover, clear		P/R	S33592
MicroLogic P/H Trip Unit Cover, opaque gray			S47067
Trip Unit Seal (6 pieces) for compliance with NEC 240.6(c)		H/J/L/P/R	MICROTUSEAL
12-pin Trip Unit Connector for NT/NW MasterPacT Circuit Breakers		P/R	S33101
12-pin Trip Unit Connector for P- and R- Frame Circuit Breakers			S33100
Battery Back-up (12 Hours)			685831

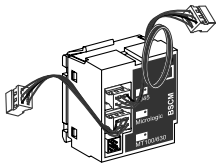
Table 7.131: Sensor Plugs for P- and R- Frame Circuit Breakers *[10]*

Description	Sensor Plug Range	Sensor Plug Cat. No.	Circuit Breaker Frames Accepting Sensor Plug								
P- Frame Circuit Breaker			250 A	400 A	600 A	630 A *[11]*	800 A	1000 A	1200 A	1250 A *[11]*	1600 A
UL	250 A	S47052	X	—	—	—	—	—	—	—	—
	400 A	S47053	—	X	X	—	X	—	—	—	—
	600 A	S48823	—	—	X	—	X	X	X	—	—
	800 A	S33092	—	—	—	—	X	X	X	—	—
	1000 A	S33093	—	—	—	—	—	X	X	—	—
	1200 A	S48824	—	—	—	—	—	—	X	—	—
IEC	630 A	S33091	—	—	—	X	X	X	—	X	X
	800 A	S33092	—	—	—	—	X	X	—	X	X
	1000 A	S33093	—	—	—	—	—	X	—	X	X
	1250 A	S33094	—	—	—	—	—	—	—	X	X
	1600 A	S33095	—	—	—	—	—	—	—	—	X
R- Frame Circuit Breaker			600 A	800 A	1000 A	1200 A	1600 A	2000 A	2500 A	3000 A	3200 A
UL	600 A	S48823	X	X	X	X	—	—	—	—	—
	800 A	S33092	—	X	X	X	X	—	—	—	—
	1000 A	S33093	—	—	X	X	X	X	—	—	—
	1200 A	S48824	—	—	—	X	X	X	X	—	—
	1600 A	S33095	—	—	—	—	X	X	X	X	—
	2000 A	S33982	—	—	—	—	—	X	X	X	—
	2500 A	S33983	—	—	—	—	—	—	X	X	—
	3000 A	S48825	—	—	—	—	—	—	—	X	—
IEC	1600 A	S33095	—	—	—	—	X	X	X	X	X
	2000 A	S33982	—	—	—	—	—	X	X	X	X
	2500 A	S33983	—	—	—	—	—	—	X	X	X
	3200 A	S33984	—	—	—	—	—	—	—	—	X

[7] Long-time pickup amperes (Ir) = Sensor Rating (In) X Setting of rating plug. "Fine adjustment tuning" is included on MicroLogic Power and Harmonic trip units, allowing for incremental settings of 1 A between the plug setting and. 40 X Sensor Rating.
[8] Includes NCTWIRING kit.
[9] Service Interface Test Kit can be ordered through SE Services only. Service Interface Test kit replaces obsoleted UTA, Hand-Held and Full Function Test Kit.
[10] For use only with circuit breakers with date codes later than 07011. For long-time pickup range, See rating plug information at page 7-61.
[11] IEC Only.

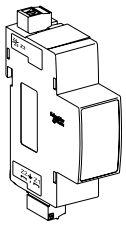


NSX Cord for Modbus Communications



Breaker Status and Control Module (BSCM)

SDTAM Module (Remote indication relay for motor applications)



ZSI Interface Module

Table 7.132: Electronic Trip Unit Accessories, Wire Harness *[12]* and ULP Cords for H-, J-, and L- Frame Circuit Breakers *[13]*

Description		Factory-Installed Cat. No. Suffix	Field-Installable Kit Cat. No.
NSX Cord *[14]* (for Modbus Communication)	L = 1.3 m (4.27 ft)	EA	S434201
	L = 3 m (9.84 ft)	EB	S434202
BSCM (Breaker Status and Control Module) with NSX Cord *[14]*	L = 1.3 m (4.27 ft)	EG *[15]*	S434201BS
	L = 3 m (9.84 ft)	EH *[15]*	S434202BS
Replacement BSCM		—	S434205
BSCM with NSX Cord for V > 480 Vac *[14]*	L = 1.3 m (4.27 ft)	EK *[15]*	S434204BS
	L = 3 m (9.84 ft)	EL *[15]*	S434303BS
SDTAM 24/415 Vac/dc Module *[16]*		V	S429424
SDX Module 24/415 Vac/dc *[17]*		V	S429532
ZSI Wire Harness, H/J Frame		YH3	S434300
ZSI Wire Harness, L- Frame		YH3	S434301
ENCT Wire Harness		YH2	S434302
OF Wire Harness		YH1	S434500
SD/SDE Wire Harness		YH1	S434501
SDx/SDTAM Wire Harness		YH1	S434502
MN Wire Harness		YH1	P434503
MX Wire Harness		YH1	P434504
24 Vdc Terminal Block Wire Harness *[18]*		YH1	S434505
Motor Operator Wire Harness		YH1	S434506
Communicating Motor Operator Wire Harness		YH1	S434507
NSX Wire Harness *[18]*		YH1	S434508

BCM ULP Communication Module

M2C programmable contacts: circuit breaker internal relay with two contacts

Table 7.133: Trip Unit Field-Installable Accessories for P- and R-Frame Circuit Breakers

Description	Factory-Installed Cat. No. Suffix	Field-Installable Kit Cat. No.						
		P- Frame					R- Frame	
		Unit Mount	I-Line	Motor Operated	Drawout	With Rotary Handle	Unit Mount	I-Line
Breaker Communication Module (BCM ULP)	E1	S64205	S64205	S64207	S64206	S64205	S64205	S64205
Replacement BCM ULP	—	33106	33106	33106	33106	33106	33106	33106
Two Programmable Contacts Module (M2C)*[19]*	V	S64273	S64273	S64273	S64273	S64273	S64273	S64273
External Voltage Sensing (EVS)	YV	S64203	S64203	S64210	S64209	S64210	S64208	S64208

Table 7.134: Trip Unit Field-Installable Accessories for MasterPacT NT/NW Circuit Breakers

Description	Factory-Installed Cat. No. Suffix	Field-Installable Kit Cat. No.			
		MasterPacT NT		MasterPacT NW	
		Fixed	Drawout	Fixed	Drawout
Breaker Communication Module (BCM ULP)	—	S48188	S47485	S47405	S48384
Replacement BCM ULP	—	33106	33106	33106	33106
Two Programmable Contacts Module (M2C)*[19]*	—	S47403	S47485	S47403	S48382
External Voltage Sensing (EVS)	—	S47506	S47507	S47506	S48533

[12] Wire harness is required for I-Line applications, optional for unit-mount applications
YH1 = all installed accessories but ZSI and ENCT
YH2 = ENCT and all installed accessories
YH3 = ZSI and all installed accessories
YH4 = ZSI, ENCT and all installed accessories
[13] For proper selection, see catalog 0611CT1001.
[14] Installation requires IFM (LV434000) for Modbus communication and/or FDM (STRV00121) for external display.
[15] If using with motor operator requires communicating motor operator (suffix NC).
[16] Remote indication relay for motor applications
[17] Remote indication relay
[18] I-Line wire harness is included for communication network accessories.
Optional wire harness for unit mount requires YH1 suffix.
[19] Compatible with MicroLogic P and H only.

MasterPacT MTZ2
800–4000 A

New!

MasterPacT MTZ Circuit Breakers

MasterPacT MTZ continues the performance and reliability of the MasterPacT line.

MasterPacT MTZ circuit breakers bring innovation and upgradability throughout the entire lifecycle, for improved power uptime, business performance, and cost control.

- Customize MicroLogic X control unit anytime
- Purchase optional Digital Modules for additional protection, measurement and maintenance & diagnostic
- Easy installation using established architectures
- Demonstrated compliance with standards
- Smartphone connectivity for wireless alerts and maintenance
- Built in power meter with Class 1 precision for smart energy metering

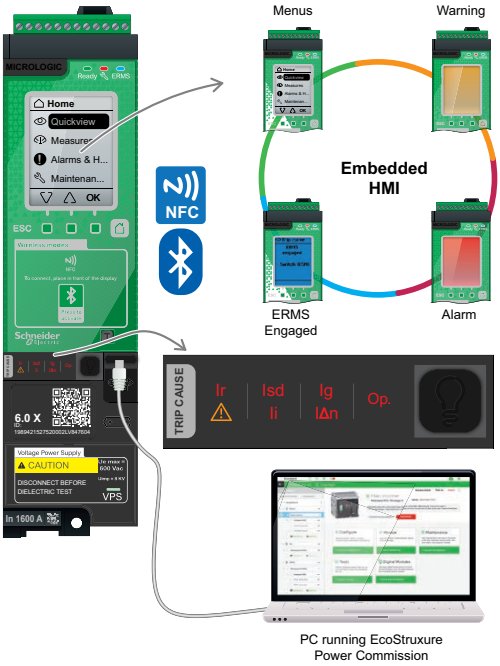
Table 7.135: MasterPacT MTZ1 Circuit Breaker Ratings

Standard Frame Rating Interrupting Code		ANSI C37 Certified/ UL 1066 Listed	UL 489 Listed													
		800 A	800 A					1200 A					1600 A *[1]*			
		N1	N	H	L1	L	LF *[2]*	N	H	L1	L	LF *[2]*	N	H	L1	L
Interrupting Current (kA RMS) 50/60 Hz	240 Vac	42	50	65	100	200	200	50	65	100	200	200	50	65	100	200
	480 Vac	42	50	50	65	100	100	50	50	65	100	100	50	50	65	100
	600 Vac	—	35	50	—	—	—	35	50	—	—	—	35	50	N/A	N/A
Short-time Withstand Current (kA RMS)		42	35	35	10	10	10	35	35	10	10	10	35	35	10	10
Built-in Instantaneous Override (kA RMS ±10%)		—	40	40	10	10	10	40	40	10	10	10	40	40	10	10
Close and latch rating (kA RMS)		40	25	25	10	10	10	25	25	10	10	10	25	25	10	10
Tested to show the arc flash hazard risk category as referenced by NFPA70E		—	—	—	—	—	Yes	—	—	—	—	Yes	—	—	—	—
Breaking time		25–30 ms with no intentional delay	25–30 ms with no intentional delay (9 ms for L and LF)													
Closing time		< 50 ms														
Sensor Rating		—	—					600–1200 A					800–1600 A			
		400–800 A	400–800 A					—								
Endurance Rating (C/O Cycles) With No Maintenance	Mechanical	12,500	12,500					12,500					12,500			
	Electrical	2800	2800					2800					2800			

Table 7.136: MasterPacT MTZ2 and MTZ3 Circuit Breaker Ratings

Standard Frame Rating Interrupting Code		ANSI C37 Certified/UL 1066 Listed																		UL 489 Listed							
		800–1600 A						2000 A					3200/4000 A *[3]*				4000/5000 A			800/1200/1600/2000 A				2500/3000 A		4000/5000/ 6000 A	
		N1	H1	H2	H3	L1 *[2]*	L1F *[2]*	H1	H2	H3	L1 *[2]*	L1F *[2]*	H1	H2	H3	L1 *[2]*	H2	H3	L1 *[2]*	N	H	L *[2]*	LF *[2]*	H	L *[2]*	H	L *[2]*
Interrupting Current (kA RMS) 50/60 Hz	240 Vac	42	65	85	10-0	200	200	65	85	100	200	200	65	85	100	200	85	100	200	65	100	200	200	100	200	100	200
	480 Vac	42	65	85	10-0	200	200	65	85	100	200	200	65	85	100	200	85	100	200	65	100	150	150	100	150	100	150
	600 Vac	42	65	85	85	130	130	65	85	85	130	130	65	85	85	130	85	85	130	50	85	100	100	85	100	85	100
Short-time Withstand Current (kA RMS)		42	65	85	85	30	22	65	85	85	30	22	65	85	85	100	85	85	100	42	65	30 *[4]*	22	65	65	85	100
Built-in Instantaneous Override (kA RMS ±10%)		35	35	35	85	35	24	—	—	85	35	24	—	—	85	117	—	—	117	40	40	35 *[4]*	24	65	65	75	75
Close and latch rating (kA RMS)		42	65	40	40	25	22	65	40	40	25	22	65	40	40	40	85	75	40	40	40	25 *[5]*	22	40	40	40	40
Tested to show arc flash hazard risk category as referenced by NFPA70E		—	—	—	—	—	Yes	—	—	—	—	Yes	—	—	—	—	—	—	—	—	—	—	Yes	—	—	—	—
Breaking time		25–30 ms with no intentional delay (9 ms for L1, L1F, L and LF)																									
Closing time		70 ms																									
Sensor Rating (A)		400–800 800–1600						1000–2000					1600–3200				2000–4000 2500–5000			400–800 600–1200 800–1600 1000–2000				1200–2500 1600–3000		2000–4000 2500–5000 3000–6000	
Endurance Rating (C/O Cycles) With No Maintenance	Mech.	12,500						10,000					10,000			5k	5,000			12,500 *[6]*				10,000		5,000	
	Elec.	2800						1,000					1,000			1k	1,000			2800 *[6]*				1,000		1,000	

[1] Fixed mounted only.
[2] Drawout mounted only.
[3] 4000 A standard width circuit breaker is not available in L1 interrupting rating code or drawout construction (fixed mounting only).
[4] 65 kA RMS for 2000 A.
[5] 40 kA RMS for 2000 A.
[6] For 2000 A N/H/L/LF devices, the endurance rating is 10,000 for mechanical and 1000 for electric.



New!

MicroLogic X Control Unit for MasterPacT MTZ Circuit Breakers

The MicroLogic X control unit protection functions include overcurrent, short-circuit, and ground-fault protection. Along with the standard protection functions LI, LSI, and LSIG, new features enhance the overall performance of a system: dual settings, fine settings, fast tripping.

MicroLogic X measures electrical parameters of a power system: currents, voltages, frequency, power, energy, power factor, current and power demand. Min/Max and average values are calculated for most of the parameters.

MicroLogic X capability for maintenance & diagnostics simplifies circuit breaker service and operations. Relevant indicators and messages are powerful tools that can help the user scheduling both preventive and predictive maintenance, and device replacement.

MasterPacT MTZ Digital Modules Options for Advanced Functions

Optional Digital Modules can be purchased and downloaded to enhance the performance of MicroLogic X control units. They are dedicated to advanced protection, measurement, and maintenance &diagnostics, and are available through Go Digital on the Schneider Electric website.

Module (Available on the Schneider Electric GoDigital Website)		Part Number
Protection		
ANSI 27/59—Under/Over Voltage Protection	Monitors the circuit breaker voltages and trips when the voltage exceeds the settings.	LV850012
ANSI 32P—Reverse Active Power Protection	Monitors the active power.	LV850011
ANSI 51N/51G—Ground-Fault Alarm	Provides an integrated ground fault alarm.	LV850007
ERMS—Energy Reducing Maintenance Settings	Used to lower the protection settings in order for the MasterPacT MTZ circuit breaker to trip faster, reducing arc energy.	LV850009
Metering		
Energy per Phase Digital Module	Calculates and displays the active, reactive and apparent energy per phase of the power system and provides total active, reactive and apparent energy per phase.	LV850002
Individual Harmonics Analysis	Provide harmonics of voltage and current to the 40th harmonic.	LV850006
Maintenance & Diagnostic		
Power Restoration Assistant,	Displays available circuit breaker information to help determine potential causes of an event and also provides guidance for potential solutions to restore power.	LV850004
MasterPacT Operation Assistant	Assists in closing or opening the circuit breaker remotely with Bluetooth by delivering applicable instructions. Requires Comm & Diag accessories.	LV850005
Waveform Capture on Trip Event	Automatically logs five cycles of phase and neutral currents.	LV850003
Modbus Legacy Dataset	Allows easy integration in existing Modbus installations where modification of supervision software for MTZ circuit breakers is not desired.	LV850045

New generation MicroLogic X control units incorporate wireless technology (Bluetooth and NFC) that allows the transfer of a wide selection of critical information (protection, measurements, maintenance & diagnostics) to your mobile device, by means of the EcoStruxure Power Device App.

Alternatively, MasterPacT MTZ can be equipped with ETHERNET communication through either the IFE module or the new embedded EIFE that includes webpages. Modbus SL communication is available through the IFM interface module.

MicroLogic X Sensor Plugs

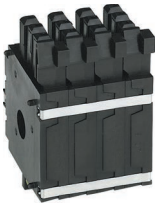
Table 7.137: Sensor Plug

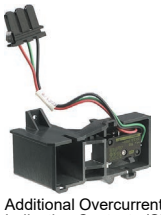
In (A)	Sensor Plug :	MTZ1-08 MTZ2-08	MTZ2-16	MTZ2-16	MTZ2-32	MTZ2-40	MTZ3–32	MTZ3–40	MTZ3–50	MTZ3–60	MTZ3–63
400	LV847053SP	X	—	—	—	—	—	—	—	—	—
600	LV848823SP	X	—	—	—	—	—	—	—	—	—
630	LV833091SP	X	X	—	—	—	—	—	—	—	—
800	LV833092SP	X	X	—	—	—	—	—	—	—	—
1000	LV833093SP	—	X	X	—	—	—	—	—	—	—
1200	LV848824SP	—	X	X	—	—	—	—	—	—	—
1250	LV833094SP	—	X	X	—	—	—	—	—	—	—
1600	LV833095SP	—	X	X	X	—	—	—	—	—	—
2000	LV833982SP	—	—	X	X	X	X	X	X	X	X
2500	LV833983SP	—	—	—	X	X	X	X	X	X	X
3000	LV848825SP	—	—	—	X	X	X	X	X	X	X
3200	LV833984SP	—	—	—	X	X	X	X	X	X	X
3600	LV836390SP	—	—	—	—	X	X	X	X	X	X
4000	LV836391SP	—	—	—	—	X	X	X	X	X	X
2000	LV847821SP	—	—	—	—	—	X	X	—	—	—
2500	LV847822SP	—	—	—	—	—	X	X	X	—	—
3000	LV848826SP	—	—	—	—	—	X	X	X	X	—
3200	LV847823SP	—	—	—	—	—	X	X	X	X	X
3600	LV836391SP	—	—	—	—	—	—	X	X	X	X
4000	LV847824SP	—	—	—	—	—	—	X	X	X	X
5000	LV847825SP	—	—	—	—	—	—	—	X	X	X
6000	LV848827SP	—	—	—	—	—	—	—	—	X	X
6300	LV847826SP	—	—	—	—	—	—	—	—	—	X

Table 7.138: Replacement Parts for MicroLogic X Control Units

Replacement Part	Part Number
MicroLogic X Embedded Display & Wireless Card	LV850054SP
Internal Battery	LV833593SP
Transparent Cover with No Access Holes to MicroLogic X Control Unit	LV839454SP
Transparent Cover with Access Holes to MicroLogic X Control Unit	LV839453SP
USB Cable (miniUSB/USB) for MicroLogic X Control Unit	LV850067SP

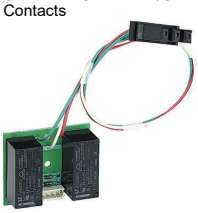

Microswitch Type ON/OFF Indication Contacts (OF) (MTZ1)

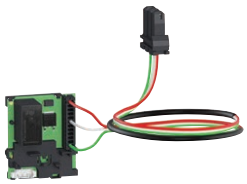

Rotary Type ON/OFF Indication Contacts (OF) (MTZ2 and MTZ3)


Additional Overcurrent Trip Indication Contacts (SDE)


Combined Connected/Closed Contacts


Connected / Disconnected / Test Position Cradle Switches (CE, CD and CT)

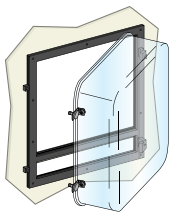

M2C programmable contacts: circuit breaker internal relay with two contacts

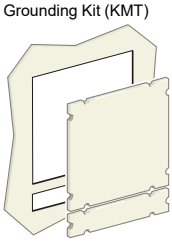

ERMS switch module (ESM)


Ready-to-close contacts (PF)


Pushbutton locking (VBP) with padlock


Grounding Kit (KMT)


Transparent Cover for Escutcheon. (CCP)


Cover for Escutcheon. (CCP)

New!

MasterPacT MTZ Accessories

Table 7.139: MasterPacT MTZ Circuit Breaker Accessories

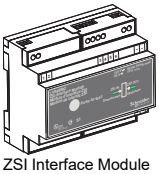
Accessory	Circuit Breaker	Version	
		Fixed	Drawout
Connection			
Horizontal and vertical rear connection	MTZ1/2/3	X	X
Front connection	MTZ1/2/3	X	X
Vertical-connection adapters	MTZ1	X	X
Cable-lug adapters	MTZ1	X	X
Spreaders	MTZ1	X	X
Disconnectable front connection adapter	MTZ2/3	X	—
Lugs for 240 mm² or 300 mm² cables	MTZ1	X	X
Interphase barriers	MTZ1/2/3	X	X
Arc chute cover (CC)	MTZ1	X	—
Brackets for mounting	MTZ2/3	X	—
Signalling			
ON/OFF indication contacts (OF)	MTZ1/2/3	X	X
Fault-trip indication contact (SDE)	MTZ1/2/3	X	X
Combined connected/closed contacts (EF)	MTZ2/3	—	X
Cradle switches (CE, CD, CT)	MTZ1/2/3	—	X
Ready-to-close contact (PF)	MTZ1/2/3	X	X
ERMS switch module (ESM)	MTZ1/2/3	X	X
Mechanical operation counter (CDM)	MTZ1/2/3	X	X
Controlling			
Diagnostic and communicating shunt close (XF diag&com)	MTZ1/2/3	X	X
Shunt close (XF)	MTZ1/2/3	X	X
Diagnostic and communicating shunt trip (MX diag&com)	MTZ1/2/3	X	X
Shunt trip (MX)	MTZ1/2/3	X	X
Diagnostic undervoltage release (MN diag)	MTZ1/2/3	X	X
Undervoltage release (MN)	MTZ1/2/3	X	X
Non-adjustable delay unit (R)	MTZ1/2/3	X	X
Adjustable delay unit (Rr)	MTZ1/2/3	X	X
Isolation module	MTZ1/2/3	X	X
Spring charging motor (MCH)	MTZ1/2/3	X	X
Electrical reset option (RES)	MTZ1/2/3	X	X
Automatic reset option (RAR)	MTZ1/2/3	X	X
Electrical closing pushbutton (BPFE)	MTZ1/2/3	X	X
Locking and Interlocking			
ON/OFF pushbutton locking (VBP)	MTZ1/2/3	X	X
OFF position locking (VSPO-VCPO)	MTZ1/2/3	X	X
Cradle locking in disconnected position by padlock	MTZ1/2/3	—	X
Cradle locking in disconnected position: by keylock (VSPD)	MTZ1/2/3	—	X
Optional connected/disconnected/test position locking	MTZ1/2/3	—	X
Safety shutters (VO)	MTZ1/2/3	—	X
Shutter position indication and locking (VIVC)	MTZ2/3	—	X
Cable-type door interlock (IPA)	MTZ1/2/3	X	X
Door interlock (VPEC)	MTZ1/2/3	—	X
Racking interlock (VPOC)	MTZ1/2/3	—	X
Racking interlock between crank and OFF pushbutton (IBPO)	MTZ2/3	—	X
Cradle rejection kit	MTZ1/2/3	—	X
Circuit Protection			
External sensor for ground-fault protection (ENCT)	MTZ1/2/3	X	X
External sensor for source ground-return (SGR) protection	MTZ1/2/3	X	X
Operation Protection			
Automatic spring discharge before circuit breaker removal (DAE)	MTZ2/3	—	X
Grounding kit (KMT)	MTZ2/3	X	X
Mechanical Protection			
Terminal cover (CB)	MTZ1/2/3	—	X
Escutcheon (CDP)	MTZ1/2/3	X	X
Blanking plate for escutcheon (OP)	MTZ1/2/3	X	X
Transparent cover for escutcheon (CP)	MTZ1/2/3	—	X
Power Supplies			
Voltage power supply (VPS)	MTZ1/2/3	X	X
External 24 Vdc power supply module (AD)	MTZ1/2/3	X	X
Battery module (BAT)	MTZ1/2/3	X	X
Mobile Power Pack by APC	MTZ1/2/3	X	X
Spare internal battery	MTZ1/2/3	X	X

EIFE Embedded Ethernet Interface

IO Application Module

IFE Interface

IFE Switchboard Server



ZSI Interface Module

Communication Accessories

Table 7.140: Monitoring and Control

Description		Catalog Number
Enerlin'X modules	EIFE Embedded Ethernet module full kit includes EIFE and EIFE cable; for MTZ1-drawout	LV851100SP
	EIFE Embedded Ethernet module full kit includes EIFE actuators and EIFE cable; for MTZ2/3-drawout	LV851200SP
	EIFE Embedded Ethernet stand-alone module; for MTZ1/2/3-drawout	LV851001SP
	Ethernet interface LV breaker	LV434001
	Ethernet interface for LV breakers and gateway	LV434002
	I/O application module	LV434063
	EIFE Cable; for MTZ1-drawout	LV851120SP
	EIFE Cable; for MTZ2/3-drawout	LV851220SP
ULP port modules	ULP port - for MasterPacT MTZ1 - fixed	LV850063SP
	ULP port - for MasterPacT MTZ1 - drawout	LV850064SP
	ULP port - for MasterPacT MTZ2/3 - fixed	LV850061SP
	ULP port - for MasterPacT MTZ2/3 - drawout	LV850062SP
Ethernet display module	Front display module FDM128	LV434128
ULP Wiring Accessories	5 RJ45 connectors female/female	TRV00870
	10 ULP line terminators	TRV00880
	10 RJ45/RJ45 male cord L = 0.3 m	TRV00803
	10 RJ45/RJ45 male cord L = 0.6 m	TRV00806
	5 RJ45/RJ45 male cord L = 1 m	TRV00810
	5 RJ45/RJ45 male cord L = 2 m	TRV00820
	5 RJ45/RJ45 male cord L = 3 m	TRV00830
	1 RJ45/RJ45 male cord L = 5 m	TRV00850
ZSI Interface Module	Connects up to 15 PowerPacT H/J/L/P/R or MasterPacT MTZ/NT/NW Circuit Breakers or for applications requiring compliance with IEC and CENELEC HD 60364–4–41 or those requiring double insulation.	LV848892SP

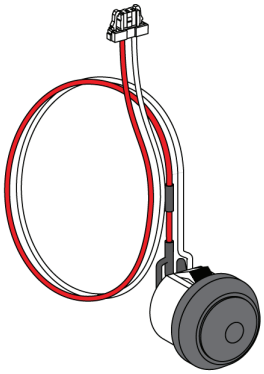
Shunt Close, Shunt Trip, and Undervoltage Release Catalog Numbers

Auxiliary, Alarm Contacts and Power Supply Catalog Numbers

Combined Contacts

Additional Overcurrent Trip Indication Contacts (SDE)

Microswitch Type ON/OFF Indication Contacts (OF) (MTZ1)



MasterPacT Electrical Closing Pushbutton (BPFE)

Table 7.141: Auxiliary and Alarm Contacts, Programmable Contact Module, Electrical Close Pushbutton

Accessory	Catalog Number	
	MTZ1	MTZ2/MTZ3
1a/1b Form C Auxiliary Switch	LV847076SP	—
Low Level 1a/1b Form C Auxiliary Switch	LV847077SP	—
4a/4b Form C Auxiliary Switch (OF)	—	LV864922SP
1a/1b Form C Connected/Closed Switch (EF)	—	LV848477SP
Low Level 1a/1b Form C Connected/Closed Switch (EF)	—	LV848478SP
1a/1b Form C Second Trip Alarm Switch (SDE2)	LV847915SP	LV847915SP
Low Level 1a/1b Form C Second Trip Alarm Switch	LV847916SP	LV847916SP
1a/1b Form C Ready-to-Close Switch (PF)	LV847080SP	LV847080SP
Low Level 1a/1b Form C Ready-to-Close Switch	LV847081SP	LV847081SP
Electrical Close Pushbutton (BPFE)	LV864917SP	LV848534SP

Table 7.142: Cradle Position Switches (Cell Switches)

Description	Catalog Number
1a/1b Form C Connected/Test/Disconnected Switch	LV833170SP
Low Level 1a/1b Form C Connected/Test/Disconnected Switch	LV833171SP
1a Connected/Test/Disconnected Switch MTZ2-3 (Ring Tongue)	LV839289SP
1b Connected/Test/Disconnected Switch MTZ2-3 (Ring Tongue)	LV839290SP
Set of 3 Cell Switch Actuating Arms	LV848560SP

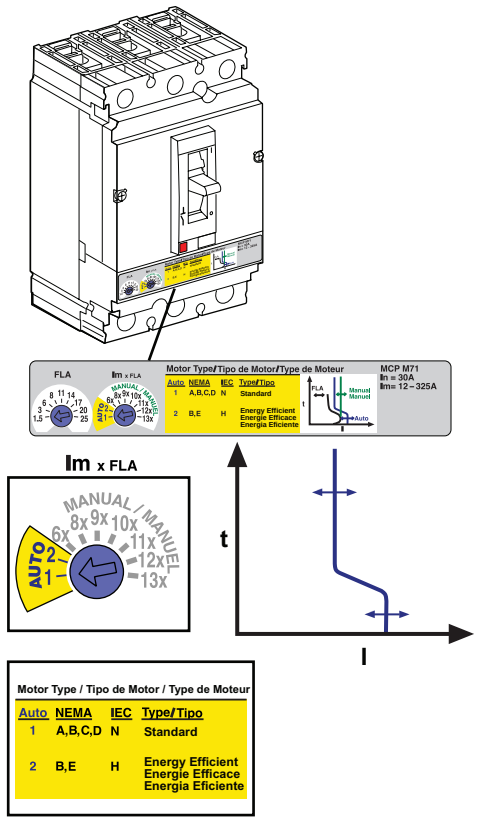
NOTE: Auxiliary, alarm and status switches' terminal blocks need to be ordered separately, see Secondary Terminal Block Kits, below.

Table 7.143: Secondary Terminal Block Kits

	Fixed MTZ1/2/3	Drawout MTZ1	Drawout MTZ2/3
Push-in Terminal kit (3 Wires)	LV847074SP	LV833098SP	LV847849SP
Push-in Terminal kit (6 Wires)	LV847075SP	LV833099SP	LV847850SP
Ring Tongue Kit 1a MTZ2-3	—	—	LV839296SP
Ring Tongue Kit 1b MTZ2-3	—	—	LV839297SP
Ring Tongue Kit 1a & 1b MTZ2-3	—	—	LV839298SP

Table 7.144: Accessories for MicroLogic X Control Units

		Catalog Numberr
External power supply module (AD)	24–30 Vdc	LV454440
	48–60 Vdc	LV454441
	100–125 Vdc	LV454442
	110–130 Vdc	LV454443
	200–240 Vdc	LV454444



Interlocks Catalog Numbers

Neutral Sensors Catalog Numbers

Motor Circuit Protection Selection

PowerPacT H- and J-frame electronic Motor Circuit Protectors (MCP) are magnetic-only instantaneous-trip circuit breakers. They are designed to offer short circuit protection and are National Electrical Code (NEC) compliant when installed as part of a combination controller having motor overload protection. MCP circuit breakers accept the same accessories and terminals as the equivalent thermal-magnetic circuit breakers.

Determine the hp rating from the nameplate of the motor. Select a MCP with an ampere rating recommended for the hp and voltage involved. When using the automatic settings the MCP microprocessor automatically adjusts the trip settings for both current and time to align with the start-up characteristic for the motor type, whether it is a standard or energy-efficient motor. This includes a dampening means to accommodate a transient motor in-rush current without nuisance tripping of the circuit breaker.

Table 7.145: H- and J-Frame Electronic Motor Circuit Protectors (MCP)

Frame	Sensor Rating	Full Load Amperes Range	Adjustable Instantaneous Trip Range	Suffix	J (See SCCR Cat. No. Table Below)	L (See SCCR Cat. No. Table Below)	R (See SCCR Cat. No. Table Below)
H-Frame	30 A	1.5–25 A	9–325 A	M71	HJL36030-M71	HLL36030-M71	HRL36030M71
	50 A	14–42 A	84–546 A	M72	HJL36050-M72	HLL36050-M72	HRL36050M72
	100 A	30–80 A	180–1040 A	M73	HJL36100-M73	HJL36100-M73	HRL36100M73
	150 A	58–130 A	348–1690 A	M74	HJL36150-M74	HLL36150-M74	HRL36150M74
J-Frame	250 A	114–217 A	684–2500 A	M75	JJL36250-M75	JLL36250-M75	JRL36250M75

Table 7.146: Maximum Rating or Setting of Motor Protective Devices *[7]*

Type of Motor		Percentage of Full-load Current	
		Setting	Not to Exceed*[8]*
A, B, C, D	Standard	800%	1300%
B, E	Energy Efficient	1100%	1700%

Table 7.147: MCP Selection by HP Ratings *[9]* **of Induction-type Squirrel-Cage and Wound-Rotor Motors** *[10]*

3Ø60 Hz Voltages*[11]*				Full-Load Amperes	Suffix
200 Vac	230 Vac	460 Vac	575 Vac		
.5–5	.5–7.5	.75–15	1–20	1.5–25	M71
5–10	5–15	10–30	15–40	14–42	M72
10–25	15–30	25–60	30–75	30–80	M73
20–40	25–50	50–100	60–125	58–130	M74
40–60	50–75	100–150	125–200	114–217	M75

Short Circuit Current Rating (SCCR)

Tested to meet NEC and UL508A requirements for short circuit current ratings as part of an approved combination controller.

Table 7.148: Short Circuit Current Ratings (SCCR)

Contactor/Starter	Interrupting Rating					
	J			L		
	200–240 Vac	480 Vac	600 Vac	200–240 Vac	480 Vac	600 Vac
Tesys D-line and F-line	100 kA	65 kA	25 kA	125 kA	100 kA	50 kA
NEMA Type S	100 kA	65 kA	25 kA	125 kA	100 kA	50 kA

See www.us.schneider-electric.us for specific ratings and combination ID numbers.

To select combination starters and motor controllers using MCP's Meeting NEC Article 430, refer to Section 16.

Accessories see page 7-51
Lugs see page 7-56
Dimensions see page 7-83
Enclosures see page 7-84

[7] Based on 2015 NEC Table 430.52.
[8] See NEC Exception No. 1 to Table 430.52. The NEC 1300% maximum setting may be inadequate for instantaneous trip circuit breakers to withstand current surges typical of the magnetization current of autotransformer type reduced voltage starters, or open transition wye-delta starters during transfer from "start" to "run," constant hp multi-speed motors, and motors labeled "high efficiency."
[9] Based on 2005 NEC Table 430.250.
[10] Per NEC 430.3, part-winding motors should select two circuit breakers, each at not more than one-half the allowable trip setting for the horsepower rating. The two circuit breakers should operate simultaneously as a disconnecting means per NEC 430.103.
[11] Listed voltages are rated motor voltages. Corresponding system voltages are 200 Vac, 220–240 Vac, 440–480 Vac and 550–600 Vac. Select wire and circuit breakers based on horsepower rather than nameplate full-load current per NEC 430.6 (A) for general motor appliations.

H-, J-Frame Motor Circuit Protectors

Table 7.149: Application of PowerPacT™ H-Frame and J-Frame Electronic Motor Circuit Protectors (MCP)

Horsepower Rating of Induction-Type Squirrel-Cage and Wound-Rotor Motors 3Ø 60 Hz					NEC Full Load Amperes	PowerPacT H-Frame and J-Frame Electronic MCP	
Starter Size	200 Vac	230 Vac	480 Vac	575 Vac			
				1/2	0.9 A	HJL36030M71 and HLL36030M71 1/2–10 hp	
			1/2		1.1 A		
				3/4	1.3 A		
			3/4	1	1.7 A		
			1		2.1 A		
		1/2			2.2 A		
				1-1/2	2.4 A		
	1/2				2.5 A		
				2	2.7 A		
			1-1/2		3 A		
00		3/4			3.2 A		
			2		3.4 A		
	3/4				3.7 A		
				3	3.9 A		
		1			4.2 A		
	1				4.8 A		
			3		4.8 A		
		1-1/2			6 A		
				5	6.1 A		
		2			6.8 A		
	1-1/2				6.9 A		
			5		7.6 A		
	2				7.8 A		
0				7-1/2	9 A		
		3			9.6 A		
	3		7-1/2	10	11 A		
			10		14 A		HJL36050M72 and HLL36050M72 10–25 hp
		5			15.2 A		
				15	17 A		
1	5				17.5 A		
			15		21 A		
		7-1/2		20	22 A		
	7-1/2				25.3 A		
			20	25	27 A		
2		10			28 A		
				30	32 A	HJL36100M73 and HLL36100M73 15–50 hp	
	10				32.2 A		
			25		34 A		
			30		40 A		
				40	41 A		
		15			42 A		
	15				48.3 A		
3			40	50	52 A		
		20			54 A		
	20			60	62 A		
			50		65 A		HJL36150M74 and HLL36150M74 30–100 hp
		25			68 A		
			60	75	77 A		
	25				78.2 A		
		30			80 A		
	30				92 A		
4			75		96 A		
				100	99 A		
		40			104 A		
	40				120 A	JJL36250M75 and JLL36250M75 50–150 hp	
			100		124 A		
				125	125 A		
		50			130 A		
				150	144 A		
	50				150 A		
5		60			154 A		
			125		156 A		
	60				177.1 A		
			150		180 A		
		75		200	192 A		
	75				221 A		
			200		240 A		
		100			248 A		

*Shaded area is not covered by J-frame electronic motor circuit protector.

Vigirex™ Ground-Fault Relay System

The Vigirex ground-fault relays, with associated sensors (current transformers), measure the residual current in an electrical installation to detect levels which may be damaging. When used for protection, they cause an associated circuit breaker or switch to interrupt the supply of power to the protected system. They may also be used for monitoring only, with output to an alarm. The product line includes fixed sensitivities from 30 mA to 1 A and adjustable sensitivities up to 30 A.

The Vigirex relays may be easily mounted on DIN rail or may be panel mounted in a meter cutout. Sensors for conductors range from a little more than an inch diameter toroids, to large rectangular sensors measuring 6 x 18 inches. The compact size of the relay and its sensor make it ideal for protection of OEM equipment as well as branch circuits.

RH99M

RH99P

Table 7.150: Vigirex Ground-Fault Relays (UL 1053 Listed)

Model	Delay	Reset	Control Voltage	Sensitivity	Cat. No.
DIN Rail Mounted					
RH10M	Instantaneous	Manual	12–24 Vac/12–48 Vdc	30 mA	56300
				100 mA	56302
				300 mA	56305
				500 mA	56306
				1 A	56307
			110–130 Vac	30 mA	56320
				100 mA	56322
				300 mA	56325
				500 mA	56326
				1 A	56327
			220–240 Vac	30 mA	56330
				100 mA	56332
				300 mA	56335
				500 mA	56336
				1 A	56337
RH21M	Instantaneous or 60 msec (2 settings)	Manual	12–24 Vac/12–48 Vdc	30 mA *[12]* or 300 mA (2 settings)	56360
			110–130 Vac		56362
			220–240 Vac		56363
RH99M	Adjustable (9 settings): 0, 0.06, 0.15, 0.23, 0.31, 0.5, 0.8, 1.0, 4.5 sec	Manual	12–24 Vac/12–48 Vdc	Adjustable, (9 settings): 0.03 *[12]*, 0.1, 0.3, 0.5, 1, 3, 5, 10, 30 A	56370TD
			110–130 Vac		56372TD
			220–240 Vac		56373TD
		Automatic	12–24 Vac/12–48 Vdc		56390TD
			110–130 Vac		56392TD
			220–240 Vac		56393TD
Panel Mounted					
RH10P	Instantaneous	Manual	12–24 Vac/12–48 Vdc	30 mA	56400
				100 mA	56402
				300 mA	56405
				500 mA	56406
				1 Amp	56407
			110–130 Vac	30 mA	56420
				100 mA	56422
				300 mA	56425
				500 mA	56426
				1 Amp	56427
			220–240 Vac	30 mA	56430
				100 mA	56432
				300 mA	56435
				500 mA	56436
				1 A	56437
RH21P	Instantaneous or 60 msec (2 settings)	Manual	12–24 Vac/12–48 Vdc	30 mA *[12]* or 300 mA (2 settings)	56460
			110–130 Vac		56462
			220–240 Vac		56463
RH99P	Adjustable (9 settings): 0, 0.06, 0.15, 0.23, 0.31, 0.5, 0.8, 1.0, 4.5 sec	Manual	12–24 Vac/12–48 Vdc	Adjustable (9 settings): 0.03 *[12]*, 0.1, 0.3, 0.5, 1, 3, 5, 10, 30 A	56470TD
			110–130 Vac		56472TD
			220–240 Vac		56473TD
		Automatic	12–24 Vac/12–48 Vdc		56490TD
			110–130 Vac		56492TD
			220–240 Vac		56493TD

PA50

SA200

Table 7.151: Sensors for Vigirex Ground-Fault Relays

Sensors	Type	Maximum Current *[13]*	Inside Diameter		Cat. No.
			in.	mm	
Closed Toroids, Type A	TA30	65 A	1.18	30	50437
	PA50	85 A	1.97	50	50438
	IA80	160 A	3.15	80	50439
	MA120	250 A	4.72	120	50440
	SA200	400 A	7.87	200	50441
	GA300	630 A	11.81	300	50442
Vigirex Sensor Iron Rings (Optional)	TA30	65 A	0.79	20	56055
	PA50	85 A	1.58	40	56056
	IA80	160 A	2.76	70	56057
	MA120	250 A	4.33	110	56058
Split toroids, Type TOA	TOA80	160 A	3.15	80	50420
	TOA120	250 A	4.73	120	50421
Rectangular Sensors	280 x 115	1600 A	11.02 x 4.53	280 x 115	56053
	470 x 160	3200 A	18.50 x 6.30	470 x 160	56054

[12] 30 mA is instantaneous only, except for RH99M and RH99P models. Their suffix TD indicates time delay at 30 mA. For models with no time delay (IEC compliant) consult catalog 0972CT0401.

[13] Use as a guideline for sizing wire through sensor.


MasterPacT NT


MasterPacT NW

MasterPacT NT and NW Circuit Breakers

The MasterPacT NT and NW universal power circuit breakers offer a family of circuit protection products meeting the most common world standards, ANSI, UL and IEC. The basic design platform for each is common. The final result is UL, ANSI and IEC circuit breakers with the same basic external dimensions, features and accessories.

- Complete product offering up to 200 k AIR without fuses
- Circuit breakers tested to show arc flash hazard risk category as referenced by NFPA70E
- 800 A to 6000 A frames, fixed and draw-out
- Rated for AC voltage systems through 600 V (635 V ANSI)
- Short-time withstand ratings up to 100 kA
- Cradle position indicator: connected, test and disconnected
- Simple, visual contact wear indicators
- Full complement of field-installable accessories common to all standards
- Four interchangeable MicroLogic trip units to choose from
- Available PowerLogic™ based power metering and monitoring capabilities
- Available protective relay functions as defined by ANSI C37.2 and C37.90

The following charts show the MasterPacT NW and NT ratings for ANSI and UL 489. See the Catalog **0613CT0001**.

Table 7.152: MasterPacT NW Circuit Breaker Ratings

Standard Frame Rating Interrupting Code		ANSI C37 Certified/UL 1066 Listed																		UL 489 Listed							
		800–1600 A						2000 A					3200/4000 A *[14]*				4000/5000 A			800/1200/1600/2000 A				2500/ 3000 A		4000/ 5000/ 6000 A	
		N1	H1	H2	H3	L1 *[15]*	L1F *[15]*	H1	H2	H3	L1 *[15]*	L1F *[15]*	H1	H2	H3	L1 *[15]*	H2	H3	L1 *[15]*	N	H	L *[15]*	LF *[15]*	H	L *[15]*	H	L *[15]*
Interrupting Current (kA RMS) 50/60 Hz	240 Vac	42	65	85	100	200	200	65	85	100	200	200	65	85	100	200	85	100	200	65	100	200	200	100	200	100	200
	480 Vac	42	65	85	100	200	200	65	85	100	200	200	65	85	100	200	85	100	200	65	100	150	150	100	150	100	150
	600 Vac	42	65	85	85	130	130	65	85	85	130	130	65	85	85	130	85	85	130	50	85	100	100	85	100	85	100
Short-time Withstand Current (kA RMS)		42	65	85	85	30	22	65	85	85	30	22	65	85	85	100	85	85	100	42 *[16]*	65 *[16]*	30 *[16] [17]*	22	65	65	85	100
Built-in Instantaneous Override (kA RMS ±10%)		35 *[18]*	35 *[18]*	35 *[18]*	85	35 *[18]*	24	—	—	85	35	24	—	—	85	117	—	—	117	40	40	35 *[16] [17]*	24	65	65	75	75
Close and latch rating (kA RMS)		42	65	40	40	25	22	65	40	40	25	22	65	40	40	40	85	75	40	40	40	25 *[19]*	22	40	40	40	40
Tested to show arc flash hazard risk category as referenced by NFPA70E		—	—	—	—	—	Yes	—	—	—	—	Yes	—	—	—	—	—	—	—	—	—	—	Yes	—	—	—	—
Breaking time		25–30 ms with no intentional delay (9 ms for L1, L1F, L and LF)																									
Closing time		70 ms																									
Sensor Rating		100–250 A 400–800 A 800–1600 A						1000–2000 A					1600–3200 A				2000–4000 A 2500–5000 A			100–250 A 400–800 A 600–1200 A 800–1600 A 1000–2000 A				1200–2500 A 1600–3000 A		2000–4000 A 2500–5000 A 3000–6000 A	
Endurance Rating (C/O Cycles) With No Maintenance	Mechanical	12,500						10,000					10,000			5k	5,000			12,500 *[20]*				10,000		5,000	
	Electrical	2800						1,000					1,000			1k	1,000			2800 *[20]*				1,000		1,000	

[14] 4000 A standard width circuit breaker is not available in L1 interrupting rating code or drawout construction (fixed mounting only).
[15] Drawout mounted only.
[16] 24 kA RMS for 800 A circuit breaker frame with 100 A or 250 A sensor.
[17] 65 kA RMS for 2000 A.
[18] None except 24 kA RMS for 800 A circuit breaker frame with 100 A or 250 A sensor.
[19] 40 kA RMS for 2000 A.
[20] The endurance rating for 2000 A, N/H/L/LF is 10,000 for mechanical and 1000 for electrical.

Table 7.153: MasterPacT NT Circuit Breaker Ratings

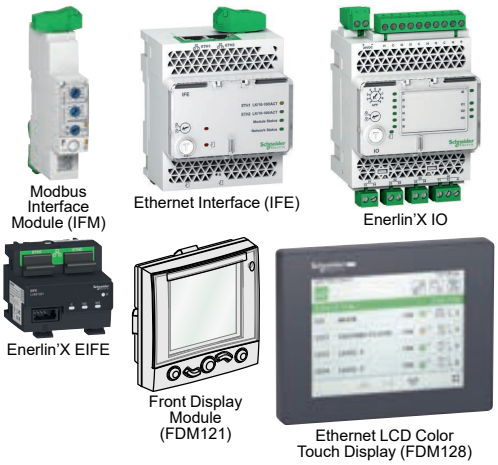
Standard Frame Rating Interrupting Code		ANSI C37 Certified/ UL 1066 Listed	UL 489 Listed												
		800 A	800 A					1200 A					1600 A *[21]*			
		N1	N	H	L1	L	LF *[22]*	N	H	L1	L	LF *[22]*	N	H	L1	L
Interrupting Current (kA RMS) 50/60 Hz	240 Vac	42	50	65	100	200	200	50	65	100	200	200	50	65	100	200
	480 Vac	42	50	50	65	100	100	50	50	65	100	100	50	50	65	100
	600 Vac	—	35	50	—	—	—	35	50	—	—	—	35	50	N/A	N/A
Short-time Withstand Current (kA RMS)		42	35	35	10	10	10	35	35	10	10	10	35	35	10	10
Built-in Instantaneous Override (kA RMS ±10%)		—	40	40	10	10	10	40	40	10	10	10	40	40	10	10
Close and latch rating (kA RMS)		40	25	25	10	10	10	25	25	10	10	10	25	25	10	10
Tested to show the arc flash hazard risk category as referenced by NFPA70E		—	—	—	—	—	Yes	—	—	—	—	Yes	—	—	—	—
Breaking time		25–30 ms with no intentional delay	25–30 ms with no intentional delay (9 ms for L and LF)													
Closing time		< 50 ms														
Sensor Rating		100–250 A	100–250 A					600–1200 A					800–1600 A			
		400–800 A	400–800 A					—								
Endurance Rating (C/O Cycles) With No Maintenance	Mechanical	12,500	12,500					12,500					12,500			
	Electrical	2800	2800					2800					2800			

NWMPRR

Table 7.154: MasterPacT NW/NT Circuit Breaker Remote Racking

Description	Cat. No.
MasterPacT NW/NT Remote Racking Devices *[23]*	NWNTMPRRT
MasterPacT NW Remote Racking Device *[23]*	NWMPRRT
MasterPacT NT Remote Rackign Device *[23]*	NTMPRRT
Mounting Bracket Kit for NW Remote Racking (contains 10 mounting brackets) *[24]*	S47100
Mounting Bracket Kit for NT Remove Racking (contains 10 mounting brackets) *[24]*	S47104
Control Unit for NW Remote Racking *[24]*	S47101
30 ft Control Cable for NW Remote Racking *[24]*	S47102
Drive Shaft for NW Remote Racking *[24]*	S47103
Drive Shaft for NT Remote Racking *[24]*	S47105

[21] Fixed mounted only.
[22] Drawout mounted only.
[23] Unit comes with 10 mounting brackets included.
[24] For replacement only.



Enerlin'X System for MicroLogic Trip Units

Enerlin'X Systems enable network connectivity for MasterPacT and PowerPacT circuit breakers to provide remote monitoring, control & alarming features which is central to the Smart Systems Architecture with Square D low voltage distribution equipment.

Enerlin'X interface modules support Smart System Applications by facilitating access to circuit breaker data that provides performance information, circuit breaker status, metering measurements and various maintenance alert indicators such as contact wear, operation counters, load profile etc.

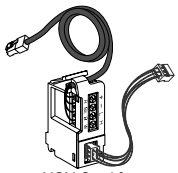
Table 7.155: Communications and IO Interface Modules and Front Display Screens for MasterPacT MTZ/NT/NW and PowerPacT H/J/L/P/R Circuit Breakers

Description	Part Number
IFM Modbus-SL Interface for LV Circuit Breaker	LV434000
IFE Interface (Ethernet Module)	LV434001
IFE Interface + Gateway (Ethernet and ModbuGateway)	LV434002
EIFE embedded Ethernet interface for drawout MasterPacT MTZ	LV851001SP
EIFE Spare part kit for one MasterPacT MTZ1 drawout circuit breaker	LV851100SP
EIFE Spare part kit for one MasterPacT MTZ2/MTZ3 drawout circuit breaker	LV851200SP
IO Module (Input/Output Programmable Module)	LV434063
FDM121 (1 Circuit Breaker to 1 Front Display over ULP)*[1]*	STRV00121
FDM128 (8 Circuit Breakers to 1 Front Display over Ethernet)	LV434128

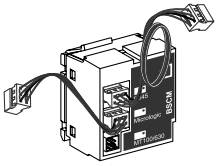
[1] The FDM121 is not compatible with MasterPacT MTZ circuit breakers.

Enerlin'X System Accessories

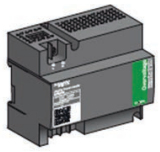
Accessories for Enerlin'X Modules



NSX Cord for Modbus Communications



Breaker Status and Control Module (BSCM)



AD External Power Supply Module 24 Vdc

ABL8RPS24030

ABL8RPS24100

Table 7.156: Accessories for Interfacing Enerlin'X Modules with MasterPacT MTZ/ NT/NW and PowerPacT H/J/L/P/R Circuit Breakers

Description		Part Number
Circuit Breaker ULP Cord—BCM to Enerlin'X Interface Module	L = 0.35 m (1.15 ft.)	LV434195
	L = 1.3 m (4.27 ft.)	LV434196
	L = 3 m (9.24 ft.)	LV434197
	L = 5 m (16.40 ft.)	LV434198
NSX Cord for V ≤ 480 V for PowePacT H/J/L	L = 1.3 m (4.27 ft.)	S434201
	L = 3 m (9.24 ft.)	S434202
NSX Cord for V > 480 V for PowePacT H/J/L	L = 1.3 m (4.27 ft.)	S434204
	L = 3 m (9.24 ft.)	S434203
	L = 4.5 m (14.7 ft.)	S434205
BSCM (Breaker Status and Control Module) with NSX Cord For PowerPacT H/J/L	L = 1.3 m (4.27 ft.)	S434201BS
	L = 3 m (9.24 ft.)	S434202BS
Replacement BSCM for PowerPacT H/J/L	L = 3 m (9.24 ft.)	S434205
BSCM with NSX Cord for V > 480 Vac for PowerPacT H/J/L	L = 1.3 m (4.27 ft.)	S434204BS
	L = 3 m (9.24 ft.)	S434203BS
ULP Cable, 10 Cables (Male to Male RJ45)	L = 0.3 m (0.98 ft.)	TRV00803
	L = 0.6 m (1.97 ft.)	TRV00806
ULP Cable, 5 Cables (Male to Male RJ45)	L = 1 m (3.28 ft.)	TRV00810
	L = 2 m (6.56 ft.)	TRV00820
	L = 3 m (9.84 ft.)	TRV00830
ULP Cable, 1 Cable (Male to Male RJ45)	L = 5 m (16.40 ft.)	TRV00850
RJ45 Female/Female Connector, 10 Connectors		TRV00870
ULP Line Terminator, 10 Terminators		TRV00880
Insulated ULP Module and Circuit Breaker Cord (for system voltage > 480 Vac) (Cord with female socket)	L = 1 m (3.28 ft.)	S434204
	L = 3 m (9.84 ft.)	S434203
Stacking Accessory (10 stacking accessories for IFM)		TRV00217
Adaptor Cable (for IFM V2 Modbus daisy chaining)		LV434211
Modbus Line Terminator for Screw Terminal, 2 Terminators		VW3A8306DRC
Modbus Line Terminator for RJ45 Terminal, 2 Terminators		VW3A8306RC
Surface-Mounting Accessory for FDM121		TRV00128
ULP Port Modules for:		
MasterPacT MTZ1 Fixed Circuit Breaker		LV850063SP
MasterPacT MTZ2/MTZ3 Fixed Circuit Breaker		LV850061SP
MasterPacT MTZ1 Drawout Circuit Breaker		LV850064SP
MasterPacT MTZ2/MTZ3 Drawout Circuit Breaker		LV850062
EIFE Cable for Drawout MasterPacT MTZ1 Circuit Breaker		LV851120SP
EIFE Cable for Drawout MasterPacT MTZ2/MTZ3 Circuit Breaker		LV851220SP

Recommended 24 Vdc Power Supplies

Available 24 Vdc power supplies include the range of Phaseo ABL8 modules and the AD modules:

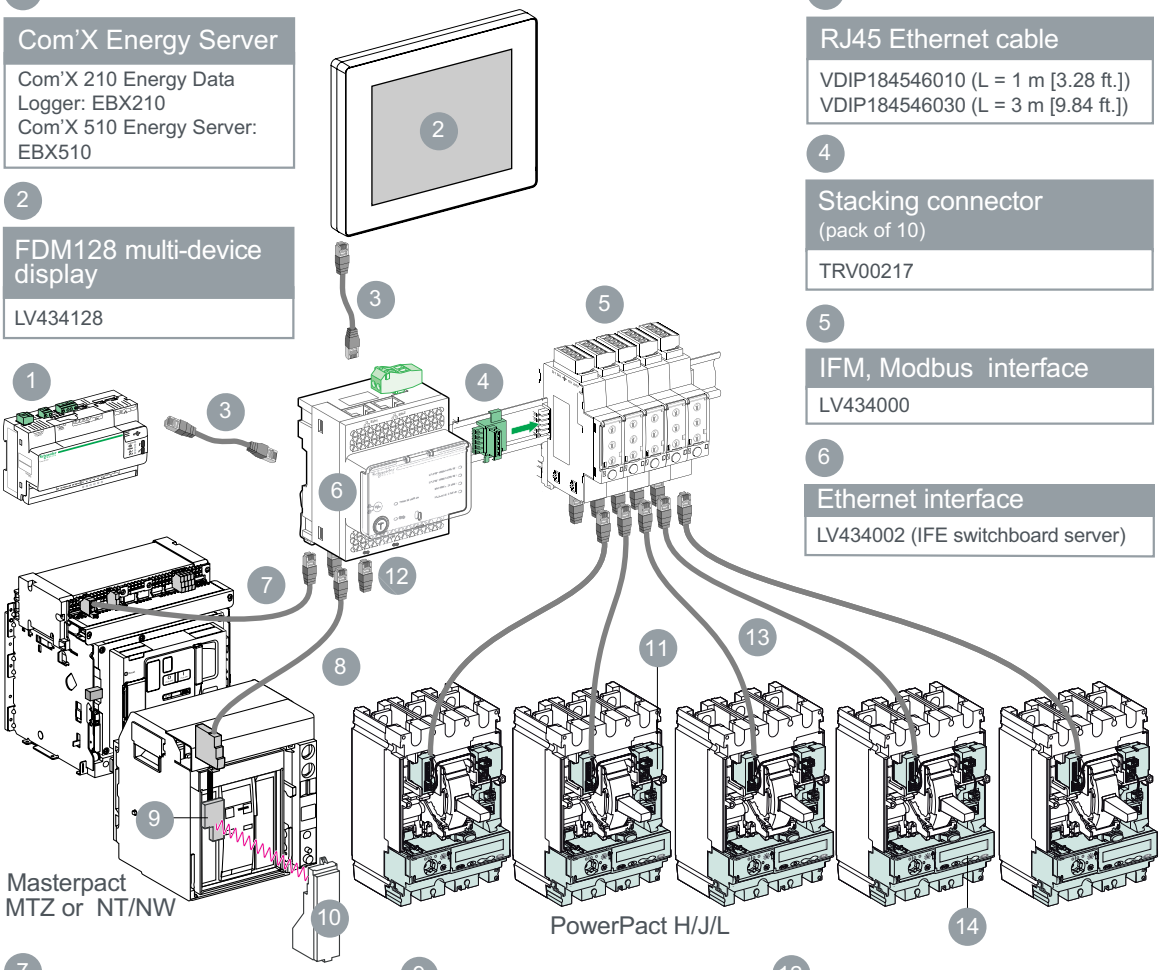
- Schneider Electric Phaseo ABL8 power supplies (3 to 10 A, overvoltage category II) are recommended for large installations.
- Schneider Electric AD power supplies (1 A, overvoltage category IV) are recommended in the following cases:
  – For installations limited to a few IMUs.
  – As a power supply of MicroLogic trip units in MasterPacT NT/NW or PowerPacT P- and R-frame circuit breakers.

Table 7.157: Power Supply Modules for MicroLogic Trip Units and Enerlin'X Modules

Power Supply	Rating	Input-Output Voltage	Catalog No.
Schneider Electric AD Power Supply Primary overvoltage category IV Temperature: –25°C tp +70°C (-13°F to +158°F)	1A	24/30 Vac, 24 Vdc	LV454440
		48/60 Vac, 24 Vdc	LV454441
		100/125 Vac, 24 Vdc	LV454442
		110/130 Vac, 24 Vdc	LV454443
		200/240 Vac, 24 Vdc	LV454444
Schneider Electric Phaseo ABL8 Power Supply Primary overvoltage category II Temperature: 0°C tp +60°C (32°F to +140°F) (derated to 80% of the current above 50°C [122°F])	3 A	100/500 Vac, 24 Vdc	ABL8RPS24030
	5 A	100/500 Vac, 24 Vdc	ABL8RPS24050
	10 A	100/500 Vac, 24 Vdc	ABL8RPS24100

Hybrid Communication—Ethernet and Modbus

NOTE: Refer the Smart System Data Acquisition user guide (https://www.schneider-electric.us/en/download/document/0614DB1801/) to aid in component selection for Smart Systems.



1

Com'X Energy Server

Com'X 210 Energy Data Logger: EBX210
Com'X 510 Energy Server: EBX510

2

FDM128 multi-device display

LV434128

3

RJ45 Ethernet cable

VDIP184546010 (L = 1 m [3.28 ft.])
VDIP184546030 (L = 3 m [9.84 ft.])

4

Stacking connector (pack of 10)

TRV00217

5

IFM, Modbus interface

LV434000

6

Ethernet interface

LV434002 (IFE switchboard server)

7

ULP Cable (RJ45)

TRV00803 (L = 0.3 m [0.98 ft.], Qty. 10)
TRV00806 (L = 0.6 m [1.97 ft.], Qty. 10)
TRV00810 (L = 1 m [3.28 ft.], Qty. 5)
TRV00820 (L = 2 m [6.56 ft.], Qty. 5)
TRV00830 (L = 3 m [9.84 ft.], Qty. 5)
TRV00850 (L = 5 m [16.40 ft.], Qty. 1)

8

PowerPact P/R and Masterpact NT/NW ULP cord

LV434195 (L = 0.35 m [1.15 ft.])
LV434196 (L = 1.3 m [4.2 ft.])
LV434197 (L = 3 m [9.8 ft.])
LV434198 (L = 5 m [16.40 ft.])

9

Communication option

BCM ULP for Masterpact NT, NW
ULP port for Masterpact MTZ

10

Circuit breaker control unit

Micrologic A, P or H for Masterpact NT/NW, PowerPact P,R
Micrologic X for Masterpact MTZ

11

BSCM module

S434205

IP addresses of Ethernet Interface (IFE) can be configured in Static or DHCP mode.

12

ULP line terminations (pack of 10)

TRV00880

13

NSX cable

S434201 (L = 1.3 m [4.27 ft.], V ≤ 480 V)
S434202 (L = 3 m [9.84 ft.], V ≤ 480 V)

Isolated NSX cable

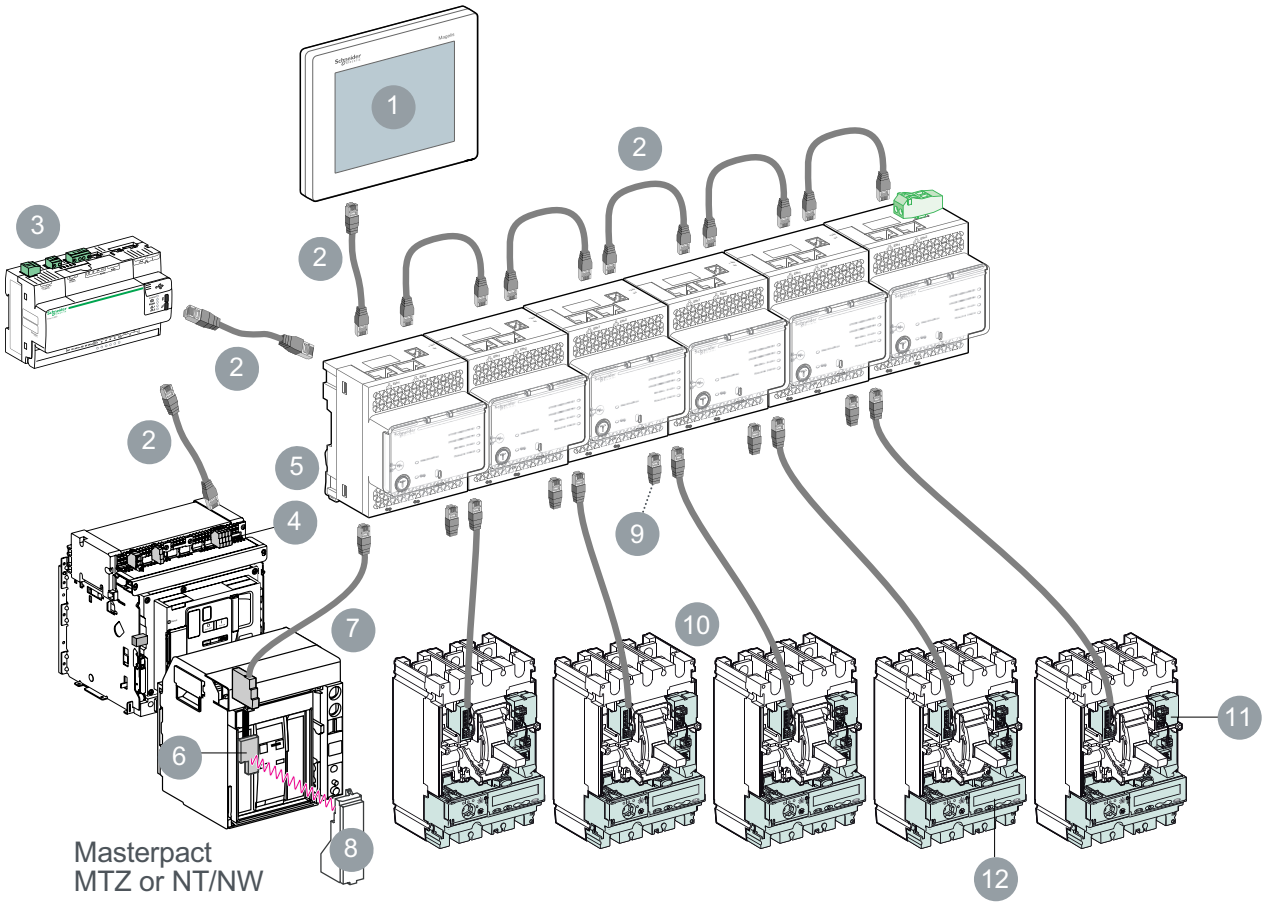
S434204 (L = 1.3 m [4.27 ft.], V > 480 V)
S434303 (L = 3 m [9.84 ft.], V > 480 V)
S434305 (L = 4.5 m [14.7 ft.], V > 480 V)

14

Micrologic E circuit breaker control unit for PowerPact H, J, L

Communications—Direct Ethernet

NOTE: Refer the Smart System Data Acquisition user guide (https://www.schneider-electric.us/en/download/document/0614DB1801/) to aid in component selection for Smart Systems.



1

FDM128 Mulit-Device Display

LV434128

2

RJ45 Ethernet Cable

VDIP184546010 (L = 1 m [3.28 ft.])
VDIP184546030 (L = 3 m [9.84 ft.])

3

Com'X Energy Server

Com'X 210 Energy Data Logger: EBX210
Com'X 510 Energy Server: EBX510

4

EIFE Embedded Ethernet Interface

LV851120SP

IP addresses of Ethernet Interface (IFE) can be configured in Static or DHCP mode.

5

IFE Ethernet Interface

LV434001

6

Communication Option

BCM ULP for Masterpact NT, NW
ULP port for Masterpact MTZ

7

PowerPact P/R and Masterpact NT/NW ULP Cord

LV434195 (L = 0.35 m [1.15 ft.])
LV434196 (L = 1.3 m [4.27 ft.])
LV434197 (L = 3 m [9.24 ft.])
LV434198 (L = 5 m [16.40 ft.])

8

Circuit breaker control unit

Micrologic A, P or H for Masterpact NT/NW, PowerPact P,R
Micrologic X for Masterpact MTZ

9

ULP line terminations (pack of 10)

TRV00880

10

NSX cable

S434201 (L = 1.3 m [4.27 ft.], V ≤ 480 V)
S434202 (L = 3 m [9.84 ft.], V ≤ 480 V)

Isolated NSX cable

S434204 (L = 1.3 m [4.27 ft.], V > 480 V)
S434303 (L = 3 m [9.84 ft.], V > 480 V)
S434305 (L = 4.5 m [14.7 ft.], V > 480 V)

11

BSCM Module

S434205

12

Micrologic E circuit breaker control unit for PowerPact H, J, L

GFM250 with Optional GFM25CT

MicroLogic™ Add-on Ground-Fault Module (GFM)

The MicroLogic Ground-Fault Module (GFM) is a UL Listed/CSA Certified circuit breaker accessory which protects equipment from damage caused by ground faults. It is an add-on module which, when connected to a PowerPacT H- or J-frame thermal-magnetic circuit breaker only, provides ground-fault sensing and ground-fault relay functions.

HD/JD ground-fault modules feature:

- Adjustable ground-fault pickup levels
- Adjustable ground-fault time delays
- Integral ground fault push-to-test feature
- Ground-fault indicator (mechanical for local, contacts for remote)
- All GFMs are supplied for I-Line™ mounting as standard, easily convertible to unit mount by removing the I-Line bracket
- Fault-powered (through the sensing current transformer) for electronics, shunt trip, and integral test feature. Meets NEC 230.95(C)
- A 12 Vdc shunt trip module (Catalog No. P29382) is required in the circuit breaker. This may be field installed or factory installed when the circuit breaker is ordered with an -SN suffix.
- UL 1053 — Ground-fault Sensing and Relaying Equipment

The GFM system requires the following:

- H-frame (15–150 A) or J-frame (150–250 A) molded case circuit breaker
- Shunt trip is required for the function of the GFM (may be factory-installed or field-installed)
- Bus bar connection (terminal nut inserts) for OFF end of circuit breaker
- Optional neutral current transformer, catalog number GFM25CT (must be ordered for 4-wire applications). NOTE: Ground-fault modules cannot be used for alarming only.

Table 7.158: Module/Enclosure Selection Chart *[1]*

Companion Circuit Breaker Prefix	Cat. No. *[2]*	I-Line Switchboard	Ground-fault Pickup Adjustment Range
HD, HG, HJ, HL	GFM150HD	LA	20–100 A
JD, JG, JJ, JL	GFM250JD	LA	40–200 A
Accessories			
H & J	GFM25CT	Optional Neutral Current Transformer (required for 4-wire loads)	

I-Line J-Frame with ELM Installed

Earth Leakage Module (ELM) for PowerPacT H- and J-Frame MCCBs

The Earth Leakage Module (ELM) is an add-on module which, when connected to a PowerPacT H- or J-frame MCCB, provides low-level ground-fault sensing and ground-fault relay functions.

Because these ELMs are highly sensitive (30 mA to 3 A), they provide much greater protection than GFMs (20 to 200 A sensitivity). The ELMs provide greater protection of control circuits and other sensitive equipment. The associated circuit breaker must have a 48 Vdc shunt trip, which may be field-installed (kit P29392) or factory-installed (suffix –SP) in the H- or J-Frame circuit breaker.

Add-on Earth Leakage Module (ELM) Features:

- Adjustable ground-fault pickup levels as low as 30 mA
- Adjustable ground-fault time delays from instantaneous to 500 msec (Time delay can be applied to the 30 mA setting)
- Integral ground fault push-to-test feature
- Ground-fault indicator; pop-up button for local status and contacts for remote indication (to be used only with the tripping option)
- All ELMs are supplied for I-Line™ mounting and are easily convertible to unit-mount by removing the I-Line brackets
- Three poles; 240 to 600 Vac maximum: 3-wire applications only (no neutral)
- Line-power obtained through internal bus to provide power for electronics, shunt trip, and integral test feature.
- A shunt trip is required in the circuit breaker; it may be field-installed or factory-installed in the PowerPacT H and J circuit breakers.
- UL 1053 – Ground-fault Sensing and Relaying Equipment

Table 7.159: ELM Selection Chart *[3]*

Companion Circuit Breaker *[4]*		Enclosure Space Required I-Line Switchboard	Pick-Up Adjustment Range	Catalog Number
Prefix	Size			
HD, HG, HJ, HL	15–150 A	LA	30 mA–3 A	ELM150HD
JD, JG, JJ, JL	150–250 A	LA	30 mA–3 A	ELM250JD

[1] At 250 A, the GFM250JD can be used with 80% rated circuit breakers only.
[2] See Supplemental Digest Section 3 for additional GFMs.
[3] At 250 A, the ELM250JD can be used with 80% rated circuit breakers only.
[4] For Factory Installation of ELM Module: For termination designation (3rd letter of catalog number) use ONLY “M”. Add factory installed 48 Vdc shunt trip (suffix SP) to breaker plus suffix VL or VM.

Miniature and Molded Case Circuit Breaker Dimensions

Table 7.160: QO™, QOU, Multi 9™ Circuit Breakers

Circuit Breaker Cat. No. Prefix	Poles	Fig. No.	Dimensions—Inches						
			A	B	C	D	E	F	G
QO, QOB	1	1	0.75	3.00 *[1]*	2.31	2.91	2.25	—	0.59
	2	2	1.50	3.00 *[1]*	2.31	2.91	2.25	—	1.34
	3	3	2.25	3.00 *[1]*	2.31	2.91	2.25	—	2.09
QOB-VH 150 A QOB-VH 110–150 A	2	2	3.0	5.72	2.53	4.90	3.78	—	2.85
	3	3	4.50	5.72	2.53	4.90	3.78	—	4.35
QO-PL QO-GFI QO-EPD	1	4	0.75	4.12 *[2]*	2.31	2.91	2.25	—	0.59
	2	5	1.50	4.12 *[2]*	2.31	2.91	2.25	—	1.34
	3	5	2.25	4.12 *[2]*	2.31	2.91	2.25	—	2.09
QOU QYU Low Ampere	1	6	0.75	4.05 *[3]*	2.38	2.98	2.25	5.00 *[4]*	0.62
	2	7	1.50	4.05 *[3]*	2.38	2.98	2.25	5.00 *[4]*	1.37
	3	8	2.25	4.05 *[3]*	2.38	2.98	2.25	5.00 *[5]*	2.12
QOU High Ampere	1	10	0.75	4.45	2.37	2.96	2.25	6.78	—
	2	11	1.50	4.45	2.37	2.96	2.25	6.78	—
	3	12	2.25	4.45	2.37	2.96	2.25	6.78	—
Multi 9™ C60	1	13	0.71	3.19	1.73	2.76	1.77	—	—
	2	14	1.42	3.19	1.73	2.76	1.77	—	—
	3	15	2.13	3.19	1.73	2.76	1.77	—	—
	4	16	2.84	3.19	1.73	2.76	1.77	—	—
QO-PLPS Power Supply	2	9	1.45	4.35	2.42	3.11	—	—	—

Table 7.161: QB, QD, QG, QJ, Q4, FA, LA, Circuit Breakers

Circuit Breaker Cat. No. Prefix	Poles	Fig. No.	Dimensions—Inches							
			A	B	C	D	E	F	G	H
QB, QD, QG, QJ	2	22	6.47	3.00	3.02	3.93	*[6]*	4.25	—	—
	3	23	6.47	4.50	3.02	3.93	*[6]*	4.25	1.50	0.75
FAL, FHL	1	21	6.00	1.50	3.16	4.13	0.44	5.13	1.50	—
	2	22	6.00	3.00	3.16	4.13	0.44	5.13	—	—
	3	23	6.00	4.50	3.16	4.13	0.44	5.13	1.50	0.75
Q4L, LAL, LHL	2 & 3	23	11.00	6.00	4.06	5.84	0.88	9.25	2.00	1.00

Table 7.162: Shipping Weights *[7]*

Frame Size	Approx. Shipping Weight (Lbs.)	Frame Size	Approx. Shipping Weight (Lbs.)
FAL, FHL 1P	2	QB, QD, QG, QJ	4
FAL, FHL 2P	3	LAL, LHL	15
FAL, FHL 3P	5	Q4L	15

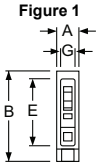
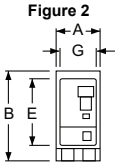
Figure 1


Figure 2


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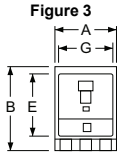
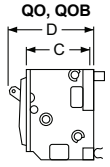


QO, QOB


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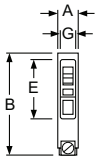

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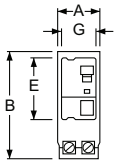
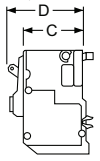
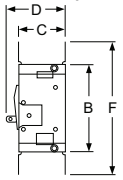


QO-GFI, QO-PL
QO-EPD


QOU, QYU
Low Ampere


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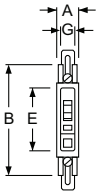

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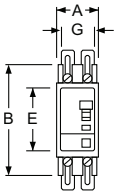

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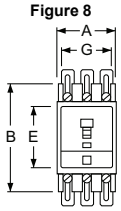
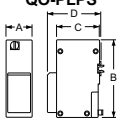


Figure 9
QO-PLPS


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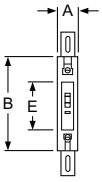

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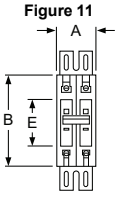
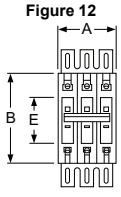


Figure 12


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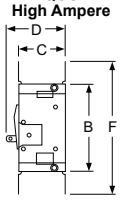

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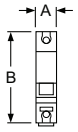

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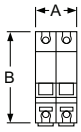

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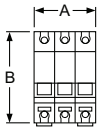

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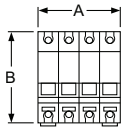

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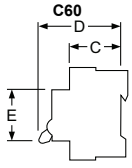

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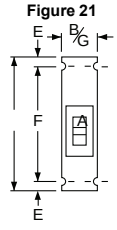

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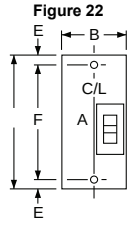

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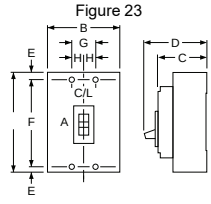


[1] 35–70 A is 3.12 in; 80–100 A 2P and 70–100 A 3P are 3.50 in.
[2] QO-PL is 4.55 in.
[3] 80–100 A 1P and 80–125 A 2P are 4.45 in.
[4] 80–100 A 1P and 80–125 A 2P are 6.78 in.
[5] 70–100 A is 6.78 in.
[6] Dimensions E are 1.59 in at ON end and 0.63 in at OFF end.
[7] All weights are for 3P circuit breakers unless otherwise noted.

Molded Case Circuit Breaker Dimensions

Table 7.163: PowerPacT B-, H-, J-, and L-Frame Circuit Breakers

Circuit Breaker Frame	No. of Poles	Fig. No.	Dimensions — Inches							
			A	B	C	D	E	F	G	H
B-Frame	1	35	6.79	1.06	3.15	4.01	0.20	6.33	—	5.39
	2	36	6.22	2.12	3.15	4.01	0.86	4.48	—	5.39
	3	37	6.22	3.19	3.15	4.01	0.86	4.48	1.06	5.39
	4	38	6.22	4.25	3.15	4.01	0.86	4.48	2.12	5.39
H-Frame	2 *[8]*	25	6.40	2.74	2.87	4.36	0.74	4.92	—	—
	3	26	6.40	4.12	2.87	4.36	0.74	4.92	1.38	—
J-Frame	3	27	7.52	4.12	2.87	5.00	1.30	4.92	1.38	—
L-Frame	3	28	13.38	5.51	3.75	6.61	2.22	7.87	1.77	—

Table 7.164: ED, EG, EJ, and GJ Circuit Breakers

Circuit Breaker Cat. No. Prefix	No. of Poles	Fig. No.	Dimensions — Inches				
			A	B	C	D	E
ED, EG, EJ	1	29	0.98	5.66	3.09	4.05	3.32
ED, EG, EJ	2	30	1.96	5.66	3.09	4.05	3.32
ED, EG, EJ	3	31	2.94	5.66	3.09	4.05	3.32
GJ	3	32	3.54	4.72	2.76	3.94	2.20

Table 7.165: PowerPacT M-, P-, and R-Frame Circuit Breakers

Circuit Breaker Frame	No. of Poles	Fig. No.	Dimensions — Inches						
			A	B	C	D	E	F	G
M-Frame (800 A and below)	2, 3	33	12.86	8.27	5.77	8.05	2.49	7.87	7.83
P-Frame (1000–1200 A)	2, 3	33	16.16	8.27	5.77	8.05	4.19	7.87	7.83
R-Frame	2, 3	34	16.24	16.54	6.63	14.49	8.73	14.25	15.35

Table 7.166: Shipping Weights *[9]*

Frame Size	Approx. Shipping Weight (Lbs.)	Frame Size	Approx. Shipping Weight (Lbs.)
B-Frame 1P	1	H-Frame 2P	4
B-Frame 2P	2	H-Frame 3P	5
B-Frame 3P	3	J-Frame	5
B-Frame 4P	4	L-Frame	14
EDB 1P	2	M-Frame	29
EDB 2P	3	P-Frame	32
EDB 3P	4	R-Frame (Without RLTB)	52

Figure 25

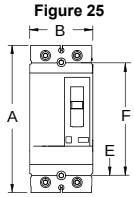


Figure 26

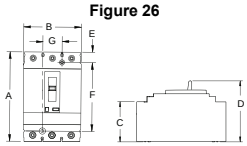
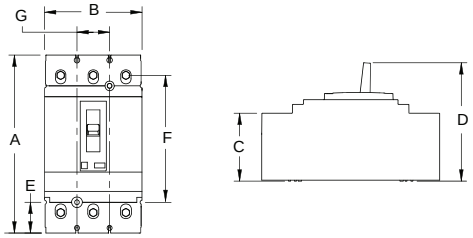


Figure 27



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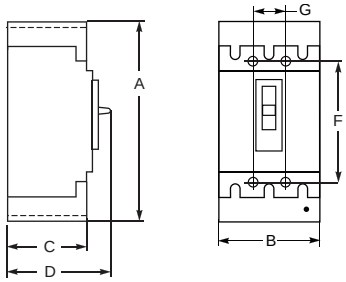

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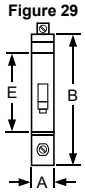

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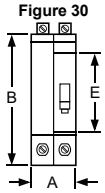

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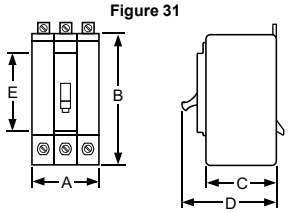

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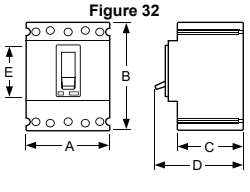

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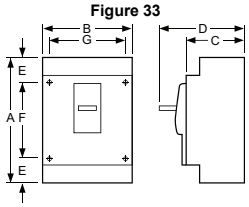

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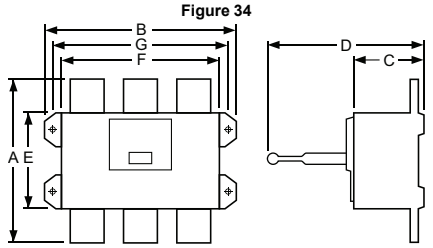


Figure 35

Figure 36

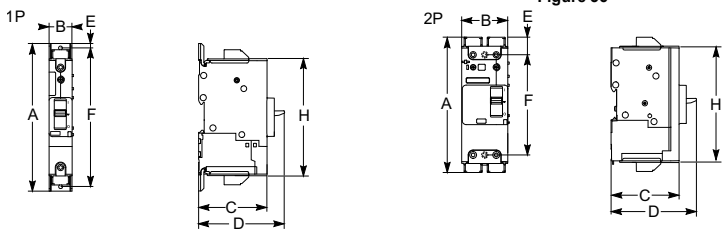
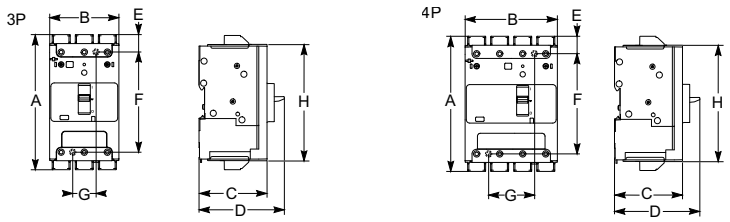


Figure 37

Figure 38



[8] Only HD and HG are in 2P module, HJ, HL and HR 2P are in 3P module.
[9] All weights are for 3P circuit breakers unless otherwise noted.

PowerPacT Circuit Breaker Enclosures

- The enclosures for the family of PowerPacT circuit breakers B- through Q-frame are cULus listed unless otherwise noted.
- The enclosures are suitable for service entrance equipment when neutral assembly is installed.
- The short circuit current rating of the enclosed circuit breakers is equal to the rating of the circuit breaker installed unless otherwise noted.
- All enclosures will accept 100% rated circuit breakers unless otherwise noted.

PowerPacT B-Frame Circuit Breaker Enclosures

- The enclosures' maximum short circuit ratings are 65 kA at 600Y, 65 kA at 480 Vac, 100 kA at 240 Vac and 50 kA at 250 Vdc unless otherwise noted.
- Enclosures accept 100% rated circuit breakers [8].

Table 7.167: PowerPacT B-Frame Circuit Breaker Enclosures

Circuit Breaker			Enclosure Catalog Number			Accessory Catalog Number	
Cat. No. Prefix	Rating	Poles				Neutral Assembly Kit	Service Ground Kit
			NEMA 1 Flush	NEMA 1 Surface	NEMA 3R		
BDL, BGL, BJL	15–100 A	2, 3	B125F	B125S	B125RB	SN100FA	PKOGTA2
BDL, BGL, BJL	110–125 A	2, 3				SN225KA	
BKL	15–30 A	2				SN100FA	
			NEMA 4, 4X, 5 Type 304 Stainless Steel	NEMA 12 With Knockouts	NEMA 12 Without Knockouts		
BDL, BGL, BJL	15–100 A	2, 3	B125DS	B125A	B125AWK *[1]*	SN100FA	PKOGTA2
BDL, BGL, BJL	110–125 A	2, 3				SN225KA	
BKL	15–30 A	2				SN100FA	

PowerPacT™ H- and J-Frame Circuit Breaker Enclosures

The enclosures' maximum short circuit ratings are 25 kAIR at 600 Vac, 65 kAIR at 480 Vac, 125 kAIR at 240 Vac and 20 kA at 250 Vdc unless otherwise noted. Enclosures accept 100% rated circuit breakers *[2]*. The enclosures are not compatible with earth-leakage or ground-fault modules.

H- and J-frame circuit breakers with MicroLogic trip units can be used with these enclosures, but have the following limitations:

- No communication accessories can be mounted in the enclosure (no IFM or Front Display Module, IFE, etc).
- The trip unit will not be accessible or visible without the removal of the cover (except J250F and J250S).
- For LSIG, there is no room for the NCT to mount in the enclosure.

Table 7.168: PowerPacT H- and J-Frame Circuit Breaker Enclosures

Circuit Breaker			Enclosure Cat. No.			Neutral Assembly Kit Cat. No.	Service Ground Kit Cat. No.
Cat. No. Prefix	Rating	Poles					
			NEMA 1 Flush	NEMA 1 Surface	NEMA 3R		
HDL	15–100 A	3	—	HD100S *[3][4][5]*	—	SN100FA	PKOGTA2
HDL, JDL	125–225 A	3	—	JD250S *[6][4][5]*	—	SN225KA	PKOGTA2
	125–250					SN400LA	
HDL, HGL	15–100 A	2	H150F	H150S	H150R *[7]*	SN100FA	PKOGTH150
	125–150 A	2				SN400LA	
HJL, HLL	15–100 A	2	J250F	J250S *[8]*	J250R *[7][9]*	SN100FA	PKOGTH150
HDL, HGL, HJL, HLL	15–100 A	3					
	125–150 A	3				SN400LA *[10]*	
JDL, JGL, JJL, JLL	150–250 A	2, 3					PKOGTJ250
			NEMA 4, 4X, 5 *[11]* Type 304 Stainless Steel *[12]*	NEMA 4, 4x, 5 *[11]* Type 316 Stainless Steel *[12]*	NEMA 12/3R Without Knockouts *[12]*		
HDL, HGL, HJL, HLL	15–100 A	2, 3	J250DS *[13]*	J250SS *[13]*	J250AWK *[13]*	SN100FA	PKOGTH150
	125–150 A	2, 3				SN400LA *[10]*	
JDL, JGL, JJL, JLL	150–250 A	2, 3					PKOGTJ250

[1] For NEMA 3R applications, remove drain scerw from bottom end well.
[2] Use only 90°C (minimum) rated wire sized per ampacity of 75°C rated conductors for 100% rated circuit breakers.
[3] Rated for 240 Vac maximum. Short circuit current rating is 25 kAIR at 240 Vac.
[4] Accepts standard 80% rated circuit breakers only. Not rated for 100% rated circuit breakers.
[5] Use copper conductors only.
[6] Rated 480 Vac maximum. Short circuit current rating is 18 kAIR at 480 V.
[7] For conduit entry through the top end wall use one of the following Square D conduit hubs: A200L for 2.00 in., A250L for 2.50 in., A300L for 3.00 in., A350L for 3.50 in. or A400L for 4.00 in.
[8] Add suffix BE if no knockouts are required on the end walls.
[9] For access to the circuit breaker's standard, ammeter or energy trip unit panel/LCD, add suffix T.
[10] For 200% neutral use copper wire only.
[11] Complete rating is NEMA 3, 3R, 4, 4X, 5, and 12.
[12] For NEMA 3R applications, remove drain screw from bottom endwall.
[13] Add suffix VW for visibility to the standard, ammeter or energy trip unit of the PowerPact circuit breaker.

PowerPacT L-Frame Circuit Breaker and Molded Case Switch Enclosures

All enclosures accept 80% rated circuit breakers. The enclosures will also accept 100% rated circuit breakers to 400 amps. The enclosures have a blank top end wall and require field-cut openings. For details and hub catalog numbers see page 3–10.

Table 7.169: PowerPacT L-Frame Circuit Breaker Enclosures

Circuit Breaker			Cat. No.			
Cat. No. Prefix	Rating	Poles	NEMA 12/3R Enclosures Without Knockouts	Neutral Assembly Kit	Copper Only Neutral Assembly Kit	Service Ground Kit
LDL, LGL, LJL, LLL, LRL	250–400 A	3	L600AWK *[14][15][16]*	SN400LA	SNC400LX	PKOGTA4
	400–600 A			SN1000MA	SNC800LX	
LGL, LLL, LRL	250–400 A	3	L600AWKMC *[17][15]*	SN400LA	SNC400LX	PKOGTA4
	400–600 A			SN1000MA	SNC800LX	

PowerPacT Q-Frame Circuit Breaker Enclosures

The enclosures for the PowerPacT Q Frame Circuit Breaker are UL listed. The short circuit ratings of these enclosed circuit breakers are equal to the interrupter ratings, at the supply voltage marked on the circuit breaker installed, unless otherwise noted.

Table 7.170: PowerPacT Q-Frame Circuit Breaker Enclosures

Circuit Breaker			Enclosure Cat. No.			Neutral Assembly Kit Cat. No.	Service Ground Kit Cat. No.
Cat. No. Prefix	Rating	Poles	NEMA 1 Flush	NEMA 1Surface	NEMA 3R		
QBL, QDL, QGL, QJL *[18]*	70–225 A	2	—	Q22200NS *[19]*	Q22200NRB *[19]*	—	PKOGTA2
		2, 3	Q23225NF	Q23225NS	Q23225NRB		

PowerPacT M- and P-Frame Circuit Breaker Enclosures

All enclosures will accept 80% rated circuit breakers. The P1200 enclosures will accept 100% rated circuit breakers to 800 A. If a CT neutral is required, the enclosure will no longer accept a 200% neutral. The M800R and the P1200R enclosures have a blank top end wall and require field-cut openings. For details and hub catalog numbers see page 3-10.

Table 7.171: PowerPacT M- and P-Frame Circuit Breaker Enclosures

Circuit Breaker			Cat. No.						
Cat. No. Prefix	Rating	Poles	Enclosure			Neutral Assembly Kit	200% Neutral Kit	CT Neutral Kit *[20][21]*	Service Ground Kit
			NEMA 1 Flush	NEMA 1 Surface	NEMA 3R				
MGL, MJL. PGL, PJL, PKL, PLL	300–800 A	2, 3	—	M800S	M800R	AL800SN	SN800SNI and 2 each SN1200	S33576MK	PKOGTA4
PGL, PJL, PKL, PLL	250–1200 A	2, 3	—	P1200S	P1200R	SN1200	—	S33576MK	PKOGTA4
			NEMA 4, 4X, 5 *[22]* Type 304 Stainless Steel *[15]*	NEMA 4, 4X, 5 *[22]* Type 316 Stainless Steel *[15]*	NEMA 12/3R Without Knockouts *[15]*				
MGL, MJL. PGL, PJL, PKL, PLL	300–800 A	2, 3	M800DS	M800SS	M800AWK	AL800SN	—	S33576MK	PKOGTA4
PGL, PJL, PKL, PLL	250–1200 A	2, 3	—	—	P1200AWK	SN1200	—	S33576MK	PKOGTA4

PowerPacT L-Frame 500 Vdc Circuit Breaker Enclosures

The PowerPacT L-frame circuit breaker enclosure's maximum short circuit rating is 20 kAIR at 250 Vdc and 50 kAIR at 500 Vdc.

Listed for use ONLY on UPS systems.

Table 7.172: DC Circuit Breaker Enclosures for LG and LL DC-Rated Circuit Breakers

Circuit Breaker *[23]*			Cat. No.		
Cat. No. Prefix	Ampere Rating	Poles	NEMA 1 Surface Enclosure	Replacement Ground Lugs	Service Ground Kit
LGL, LLL	300–600 A	3	L1200S	8010440301	Standard
	700–1200 A	4	L1200S		

[14] Will accept PowerPacT L-frame circuit breakers and Motor Protectors with suffixes M38X
[15] For NEMA 3R applications, remove drain screw from bottom endwall.
[16] Add suffix VW for visibility to the standard, ammeter or energy trip unit of the PowerPact circuit breaker.
[17] Will accept PowerPacT L-frame Molded Case Switches.
[18] When the QJL circuit breaker is installed in the enclosure, the enclosure is limited to Short Circuit Current ratings of 65 kAIR at 240 V and 100 kAIR at 208 V.
[19] Limited to 200 A.
[20] Order current transformer kit S33576 seperately.
[21] Current transformers applicable only on PowerPacT P circuit breakers. Current limitations are 400–800 A and 400–1200 A respectively for the M800 and P1200 family of enclosures.
[22] Complete rating is NEMA 3, 3R, 4, 4X, 5, and 12.
[23] Use 500 Vdc or 250 Vdc rated circuit breakers only.

LA400AWK LA400S LA400R

LA/LH/Q4 Circuit Breaker Enclosures

LA/LH/Q4 Thermal-Magnetic Circuit Breaker Enclosures

The enclosures for the LA/LH/Q4 thermal-magnetic circuit breakers are UL listed and CSA certified. The enclosures are suitable for service entrance equipment when neutral assembly is installed. The short circuit ratings of these enclosed circuit breakers are equal to the interrupter rating, at the supply voltage marked on the circuit breaker installed.

The LA400R enclosure has a blank top end wall and requires field cut openings. For details and hub catalog numbers see Digest Section 3.

Table 7.173: LA/LH/Q4 Thermal-Magnetic Circuit Breaker Enclosures

Circuit Breaker			Enclosure			Neutral Assembly Kit	Service Ground Kit
Cat. No. Prefix	Rating	Poles	Cat. No.	Cat. No.	Cat. No.	Cat. No.	Cat. No.
			NEMA 1 Flush	NEMA 1 Surface	NEMA 3R		
LAL, LHL, Q4L	125–225 A	2, 3	LA400F *[24]*	LA400S *[24]*	LA400R	SN225KA	PKOGTA2
	225–400 A					400SN	
LAL	125–400	3	—	LA400LS *[25][26][27][28]*	—	SN400LA	
			NEMA 4, 4X, 5 *[29]* Type 304 Stainless Steel *[30]*	NEMA 12K With Knockouts	NEMA 12/3R Without Knockouts *[30]*		
LAL, LHL, Q4L	125–225 A	2, 3	LA400DS *[27]*	—	LA400AWK *[27]*	SN225KA	PKOGTA2
	225–400 A					SN400LA	

Enclosures for Special Applications

Hazardous Locations: NEMA 7 And NEMA 9 Circuit Breaker Enclosures

The NEMA 7 and 9 enclosures are cULus listed unless otherwise noted. They are rated for use in hazardous locations as defined in NEC Article 500. The short circuit current rating of the enclosed circuit breakers is equal to the rating of the circuit breaker installed unless otherwise noted. They are suitable for use as service entrance equipment when neutral is installed. Enclosures require the use of 75°C copper wire only. The NEMA 7 enclosures are suitable for rainproof applications when the included PKDB1 breather and drain kit is installed.

Table 7.174: NEMA 7 and NEMA 9 Circuit Breaker Enclosures; Thermal-Magnetic B-Frame and PowerPacT J-Frame Cicuit Breakers

Circuit Breaker			Enclosure Catalog Number		Neutral Assembly Kit Cat. No.	Service Ground Kit Cat. No.	Threaded Conduit Provisions, Inches
Cat. No. Prefix	Rating	Poles	NEMA 7/9 Cast Aluminum *[31][32]*	NEMA 9 Cast Aluminum *[32]*			
BKL	15–30 A	2	B100X	—	100SNA	Included	1 1//4 in.
BDL, BGL, BJL	15–100 A	2, 3					
JDL, JGL	150–225 A	2, 3	J225X *[33][34]*	J225Y *[33][34]*	225SNA	Included	2 1/2 in.

Enclosed Molded Case Switches

For information on enclosed molded case switches, see Supplemental Digest Section 3.

[24] Enclosures are provided with the Handle Padlock Attachment (HPALM) for field installation to lock the circuit breaker in the “ON” or “OFF” positions.
[25] Use copper conductors only.
[26] Maximum short circuit and voltage is 30 kAIR at 480 Vac.
[27] LAL or LHL circuit breakers with an MB or MT suffix are not compatible with these enclosures: LA400DS, LA400AWK, and LA400LS.
[28] Enclosure cover has an integral padlock provision to provide a means to lock the circuit breaker in the “ON” or “OFF” position.
[29] Complete rating is NEMA 3, 3R, 4, 4X, 5, and 12.
[30] For NEMA 3R applications, remove drain screw from bottom endwall.
[31] NEMA 7 — Indoor Hazardous Locations — Division 1 and 2, Class I, Groups C and D; Class II, Groups E, F and G; Class III
[32] NEMA 9 — Indoor Hazardous Locations — Division 1 and 2, Class ii, Groups E, F and G; Class iii
[33] Short circuit current rating: 65 kAIR at 240 Vac, 25 kAIR at 480 Vac, and 18 kAIR at 600 Vac
[34] Not cULus listed due to wire bending space.

Enclosure Accessories

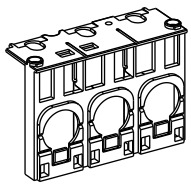
Table 7.175: Neutral Kit Terminal Data

Neutral Kit Catalog Number	Terminal Lug Data -Total Available (Line plus Load) AWG/kcmil AL/CU	All Copper Neutral Terminal Lug Data -Total Available (Line plus Load) AWG/kcmil
100SNA	(2) 14–1/0 Cu or (2) 12–1/0 Al plus (1) 14–4 Cu	—
SN100FA	(4) 14–1/0 Cu or (4) 12–1/0 Al	—
SN225KA	(2) 4–300 Al/Cu plus (2) 14–1/0 Al/Cu	—
225SNA	(4) 6–350 Al/Cu	—
400SN	(2) 1–600 or (4) 1–250 Al/Cu, plus (2) 4–300 Al/Cu	—
SN400LA	(2) 1–600 or (4) 1–250 Al/Cu, plus (2) 4–300 Al/Cu	—
SN1000MA	(6) 3/0–500 Al/Cu, plus (1) 1–4/0 Al/Cu	—
SNC400LX	—	(2) 2—600 Cu, plus (2) 6–250 Cu
SNC800LX	—	(4) 2–600 Cu, plus (1) 2–4/0 Cu
AL800SN	(6) 3/0–500 Al/Cu, plus (2) 6–250 Al/Cu	—
SN1200	(8) 3/0–750 Al/Cu, plus (2) 6–350 Al/Cu	—
S33576MK	(8) 3/0–500 Al/Cu, plus (2) 4–300 Al/Cu	—

Table 7.176: Service Ground Kit Terminal Data

Service Ground Kit Catalog Number	Terminal Data AWG/kcmil	Lugs Per Kit
PKOGTA2	10–2/0 Cu or 6–2/0 Al	2
PKOGTH150	14–2 Al/Cu	2
PKOGTJ250	6–300 Al/Cu	2
PKOGTA4	6–250 Al/Cu	4

Terminal Shields for Service Entrance Applications
– Can be applied as line side barriers in service entrance applications
– Will fit on top or bottom of the circuit breaker



J-Frame Short Lug Shield

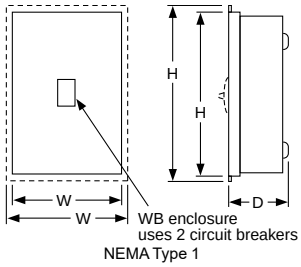
Table 7.177: Terminal Shields

Frame	2P	3P
PowerPacT Q	QSB2	QSB3
PowerPacT H (3 AWG Max. Wire Size)	—	S37446
PowerPacT H (3/0 Max. Wire Size)	—	S37447
PowerPacT J	—	S37448
PowerPacT M	—	MGJTC
PowerPacT P	—	PA12TC
LA/LH	—	LAHTC

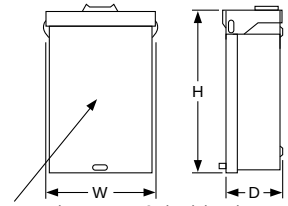
See Supplemental Digest Section 3 for special options for enclosures:

- Stainless steel fronts
- Pilot lights, push buttons
- Lock-on SPL0
- Key interlock systems
- Legend plates

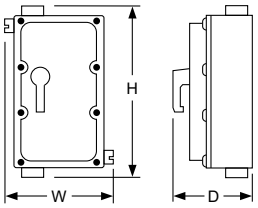
Enclosure Dimensions



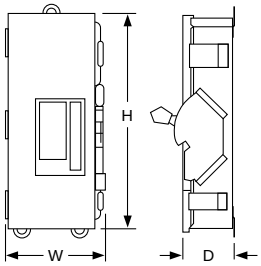
WB enclosure uses 2 circuit breakers
NEMA Type 1



WB enclosure uses 2 circuit breakers
NEMA Type 3R
(Uses side hinge cover)



NEMA Type 7, Type 9



NEMA Type 4, 4X, 5, 12, 12K

Table 7.178: Dimensions

Cat. No.	Series	Approximate Dimension					
		H		W		D	
		in.	mm	in.	mm	in.	mm
B125F	A01	19.5	495	9.88	251	4.13	105
B125S	A01	18.13	461	8.63	219	4.13	105
B125FSS	A01	19.5	495	9.88	251	4.13	105
B125RB	A01	18.0	457	8.88	226	4.88	124
B125DS	A01	19.5	495	9.13	232	4.88	124
B125SS	A01	19.5	495	9.13	232	4.88	124
B125A	A01	19.5	495	9.13	232	4.88	124
B125AWK	A01	19.5	495	9.13	232	4.88	124
B125AWKMC	A01	19.5	495	9.13	232	4.88	124
HD100S	A01	17.00	431.8	7.90	200.7	4.75	120.7
H150F	A01	32.40	823	15.40	391	6.00	152
H150R	A01	31.05	789	14.47	368	6.28	160
H150S	A01	31.36	797	14.36	365	6.00	152
J250F	A01	32.40	823	15.40	391	6.00	152
J250R	A01	31.05	789	14.47	368	6.28	160
J250S	A01	31.36	797	14.36	365	6.00	152
J250DS	A01	32.26	819	9.72	247	7.94	202
J250SS	A01	32.26	819	9.72	247	7.94	202
J250AWK	A01	32.26	819	9.72	247	7.94	202
JD250S	A01	26.40	670.6	8.90	226.1	5.50	139.7
J225X	A01	22.70	577	10.93	278	7.70	196
J225Y	A01	22.70	577	10.93	278	7.70	196
L600AWK	A01	57.50	1461	20.38	518	8.25	210
L600AWKVW	A01	57.50	1461	20.38	518	8.25	210
L600AWKMC	A01	57.50	1461	20.38	518	8.25	210
L1200S	A01	51.88	1818	20.25	514	7.75	197
LA400AWK	E05	42.25	1073	13.75	349	7.25	184
LA400DS	E05	42.25	1073	13.75	349	7.25	184
LA400F	E03	45.63	1159	16.50	419	6.50	165
LA400R	E03	44.00	1118	15.38	391	7.88	200
LA400S	E03	44.50	1130	15.38	391	6.50	165
LA400LS	A01	27.40	696.0	15.40	391.2	6.625	168.3
M800S	A01	40-3/8	1025.52	21	533.4	9-3/4	247.65
M800R	A01	40-3/8	1025.52	21	533.4	9-3/4	247.65
M800DS	A01	40-7/8	1036.96	20-3/4	527.05	9-1/2	241.3
M800SS	A01	40-7/8	1036.96	20-3/4	527.05	9-1/2	241.3
M800AWK	A01	40-7/8	1036.96	20-3/4	527.05	9-1/2	241.3
P1200S	A01	52-1/8	1323.98	21	533.4	9-3/4	247.65
P1200R	A01	52-1/8	1323.98	21	533.4	9-3/4	247.65
P1200AWK	A01	53	1346.20	20-3/4	527.05	9-1/2	241.3
Q22200NRB	E05	23.38	594	7.63	194	4.75	121
Q22200NS	E05	23.13	588	7.63	194	4.25	108
Q23225NF	E05	26.25	667	9.88	251	4.75	121
Q23225NRB	E05	26.25	667	9.88	251	5.50	140
Q23225NS	E05	26.25	667	9.88	251	4.75	121