

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.

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
- CSA/UL Listed 48 Vdc (5 k AIR)
- CSA/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.

QOU Low Ampere Miniature Circuit Breakers

Ampere Rating	1P 120/240 Vac		2P 120/240 Vac		2P 240 Vac		3P 240 Vac	
	Cat. No.	\$ Price	Cat. No.	\$ Price	Cat. No.▲	\$ Price	Cat. No.	\$ Price
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		QOU325	
30 A	QOU130		QOU230		QOU230H		QOU330	
35 A	QOU135		QOU235		—		QOU335	
40 A	QOU140		QOU240		—		QOU340	
45 A	QOU145		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	
20 A	QOU120VH		QOU220VH		—		QOU320VH	
25 A	QOU125VH		QOU225VH		—		QOU325VH	
30 A	QOU130VH		QOU230VH		—		QOU330VH	
35 A	QOU135VH		QOU235VH		—		—	
40 A	QOU140VH		QOU240VH		—		—	
45 A	QOU145VH		QOU245VH		—		—	
50 A	QOU150VH		QOU250VH		—		—	
60 A	QOU160VH		QOU260VH		—		—	

▲ QOU-H interrupting rating is 10 kA at 240 Vac.

QOU-HM Miniature Circuit Breakers (10 k AIR)

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

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)
- CSA/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.

QOU High Ampere Miniature Circuit Breakers (10 k AIR)

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

QOU Non-Automatic Switches

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

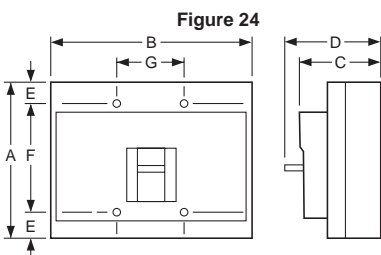
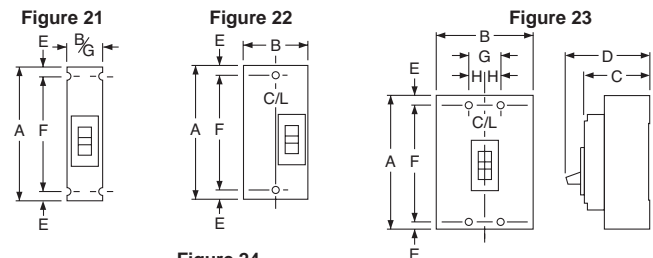
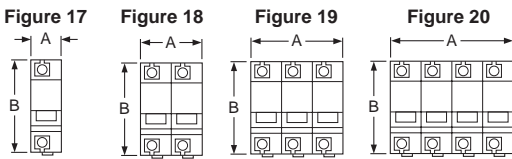
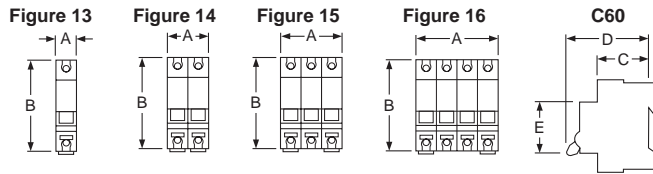
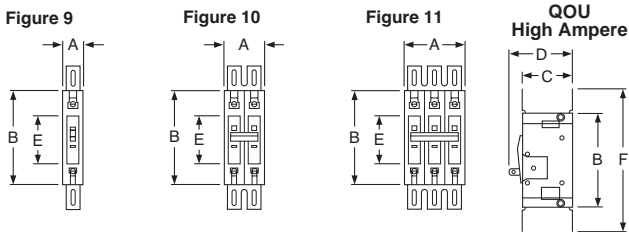
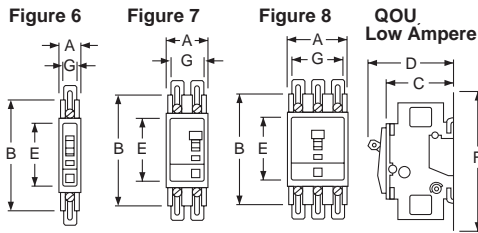
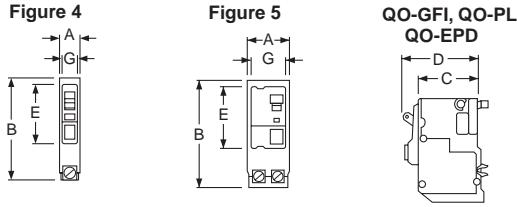
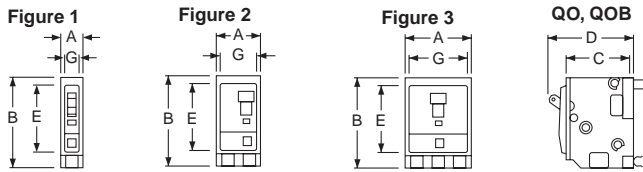
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High Ampere QOU

Dimensions and Shipping Weights

Miniature and Molded Case Circuit Breakers



QO™, QOU, Multi 9™ Circuit Breakers

Circuit Breaker Catalogue No. Prefix	No. Poles	Fig. No.	Dimensions—Inches						
			A	B	C	D	E	F	G
QO, QOB	1	1	0.75	3.00▲	2.31	2.91	2.25	...	0.59
	2	2	1.50	3.00▲	2.31	2.91	2.25	...	1.34
	3	3	2.25	3.00▲	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■	2.31	2.91	2.25	...	0.59
	2	5	1.50	4.12■	2.31	2.91	2.25	...	1.34
	3	5	2.25	4.12■	2.31	2.91	2.25	...	2.09
QOU Low Ampere	1	6	0.75	4.05♦	2.38	2.98	2.25	5.00▼	0.62
	2	7	1.50	4.05♦	2.38	2.98	2.25	5.00▼	1.37
	3	8	2.25	4.05★	2.38	2.98	2.25	5.00△	2.12
QOU High Ampere	1	9	0.75	4.45	2.37	2.96	2.25	6.78	...
	2	10	1.50	4.45	2.37	2.96	2.25	6.78	...
	3	11	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	—	—

- ▲ 35–70 A is 3.12 in; 80–100 A 2-pole and 70–100 A 3-pole are 3.50 in.
- QO-PL is 4.55 in.
- ♦ 80–100 A 1-pole and 80–125 A 2-pole are 4.45 in.
- ★ 70–100 A 4.45 in.
- ▼ 80–100 A 1-pole and 80–125 A 2-pole are 6.78 in.
- △ 70–100 A is 6.78 in.

QB, QD, QG, QJ, Q4, FA, FI, KI, LA, LH Circuit Breakers

Circuit Breaker Catalogue No. Prefix	No. 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	□	4.25
	3	23	6.47	4.50	3.02	3.93	□	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
FIL, KIL	2 & 3	23	8.00	4.50	3.66	4.75	0.44	7.13	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

□ Dimensions E are 1.59 in at ON end and 0.63 in at OFF end.

Shipping Weights ◊

Frame Size	Approx. Shipping Weight (Lbs.)	Frame Size	Approx. Shipping Weight (Lbs.)
FAL, FHL 1P	2	KIL	9
FAL, FHL 2P	3	LAL, LHL	15
FAL, FHL 3P	5	LIL LXIL	25
FIL	8	Q4L	15
QB, QD, QG, QJ	4		

◊ All weights are for 3P circuit breakers unless otherwise noted.

QOU Miniature Circuit Breakers and Switches Application Information

Table 1: Selection Data

Catalog Number								Terminal Lug Wire Size (AWG)
Rating	One-Pole		Two-Pole			Three-Pole		
	120/240 Vac		120/240 Vac	240 Vac	120/240 Vac	240 Vac		
	10K AIR	22K AIR	10 K AIR		22K AIR	10K AIR		
10 A	QOU110	—	QOU210	—	—	QOU310	1—#14—#2 Cu or Al	
15 A	QOU115*	QOU115VH	QOU215*	QOU215H*	QOU215VH	QOU315*		
15 A	QOU115HM*†	—	—	—	—	—		
20 A	QOU120*	QOU120VH	QOU220*	QOU220H*	QOU220VH	QOU320*		
20 A	QOU120HM*†	—	—	—	—	—		
25 A	QOU125*	QOU125VH	QOU225*	QOU225H*	QOU225VH	QOU325*		
30 A	QOU130*	QOU130VH	QOU230*	QOU230H*	QOU230VH	QOU330*		
35 A	QOU135*	QOU135VH	QOU235*	—	QOU235VH	QOU335*		
40 A	QOU140*	QOU140VH	QOU240*	—	QOU240VH	QOU340*		
45 A	QOU145*	QOU145VH	QOU245*	—	QOU245VH	QOU345*		
50 A	QOU150*	QOU150VH	QOU250*	—	QOU250VH	QOU350*		
60 A	QOU160*	QOU160VH	QOU260*	—	QOU260VH	QOU360*		
70 A	QOU170*	—	QOU270*	—	—	QOU370‡		1—#12—#2/0 Cu or Al
80 A	QOU180‡	—	QOU280‡	—	—	QOU380‡		
90 A	QOU190‡	—	QOU290‡	—	—	QOU390‡		
100 A	QOU1100‡	—	QOU2100‡	—	—	QOU3100‡		
125 A	—	—	QOU2125‡	—	—	—		
Switch—60 Amperes Max.—240 Vac				QOU200	—	QOU300	1—#14—#2	
Switch—100 Amperes Max.—240 Vac				QOU2000‡	—	QOU3000‡	1—#12—#2/0	
Switch—125 Amperes Max.—240 Vac				QOU20001‡	—	QOU30001‡	1—#12—#2/0	

* UL Listed as HACR type for use with heating, air conditioning and refrigeration equipment containing motor-group combinations and marked for use with HACR type circuit breakers.

† High-magnetic trip circuit breakers. Recommended for applications where high initial inrush current can occur and for individual dimmer applications.

‡ Available as Series 1 with forward box lugs only. (No optional terminations)

Tripping Mechanisms

A tripping mechanism is an assembly within the circuit breaker molded case that causes the circuit breaker to open automatically under sustained overload or short circuit conditions.

The tripping mechanisms in two- and three-pole circuit breakers operate such that an overcurrent on any pole of the circuit breaker will cause all poles of the circuit breaker to open simultaneously. Thermal and magnetic factory calibration (with current) is performed on each pole of every Square D circuit breaker.

These mechanisms operate to trip the circuit breaker:

- Thermal trip
- Magnetic trip
- Optional shunt trip accessory (see Accessories, page 12)

The sensing system is an integral part of a thermal-magnetic circuit breaker. The sensing system continually monitors current flowing through the circuit breaker. It detects abnormal current conditions and, depending on the magnitude of the current, initiates an inverse-time or an instantaneous tripping response. This action causes the tripping mechanism to open the circuit breaker contacts and interrupt current flow. The speed of the tripping process must be controllable and inversely matched to the severity of the overcurrent. QOU miniature circuit breakers have an over-center toggle mechanism for quick-make, quick-break action with positive handle indication. The handle assumes a position between ON (I) and OFF (O) when the circuit breaker has tripped.

QOU Miniature Circuit Breakers and Switches Application Information

Line and Load Connections

QOU miniature circuit breakers are supplied with two types of lug configuration as standard, depending on the continuous current rating:

- 10–70 ampere one- and two-pole; reversible lugs
- 10–60 ampere three-pole; reversible lugs
- Other ampere ratings; forward lugs only

The box-type lugs supplied on QOU miniature circuit breakers are UL Listed and CSA certified to accept solid or stranded, aluminum or copper conductors. These lugs are UL Listed to be used with wire rated at 140° F, 167° F and 194° F (60° C, 75° C and 90° C), sized according to the NEC 176° F (75° C) temperature rating. See the Accessories section for more information on terminations.

Optional terminations, such as quick connectors, are also available. See the Accessories section for more information on terminations.

Ring-tongue terminals can be factory ordered using the following catalog number designations:

- QOU__ _3100 (ring-tongue terminal wired from front)
- QOUR__ _5283 (ring-tongue terminal wired from rear)

Mounting Provisions

QOU miniature circuit breakers are supplied with mounting brackets for both line and load side support. Mounting brackets are field installable and can be attached to the front or back of the circuit breaker molded case. See the Accessories section for more information on mounting brackets. Tapped mounting feet can be ordered using the catalog number designation QOU__ _3100.

All QOU miniature circuit breakers also come equipped with slots in the molded case for DIN rail mounting.

These miniature circuit breakers are designed for use with a standard 35 mm DIN mounting rail (DIN/EU 50 022, 0.30 x 1.38 in. [7.5 mm x 35 mm]).

Standards

Square D brand QOU miniature circuit breakers are manufactured and tested according to the following standards:

- UL Standard 489 (File E84967)
- NEMA Standard AB1
- Canadian Standards Association CSA C22.2 No. 5-02
- IEC 60947-2
- CE

Square D brand QOU non-automatic switches comply with:

- UL Standard 489
- Canadian Standards Association CSA C22.2 No. 5-02

NOTE: Circuit breakers are to be applied by guidelines detailed in the NEC and other applicable electrical codes.

QOU Miniature Circuit Breakers and Switches

Application Information

Catalog Numbers

Square D brand circuit breakers are ordered by a catalog number that includes the circuit breaker family, description, number of poles, amperage rating and suffix.

Table 2: Catalog Numbers

	Typical Catalog Number:					
	QO	U	2	30	H	2100
QO Miniature Circuit Breaker Family						
Description						
U – Unit Mounted (Lugs on Both Ends)						
No. of Poles						
1 – 1-pole						
2 – 2-pole						
3 – 3-pole						
Ampere Rating						
10–125 Ampere Rating						
00 = 60 A, 000 = 100 A, and 0001 = 125 A QOU Switch						
Rating						
1- and 2-pole	2-pole		3-pole			
No Letter-Standard 120/240 Vac Rating	VH - 22,000 AIR		No Letter - 240 Vac Rating			
VH - 22,000 AIR	H-240 Vac Rating		VH - 22,000 AIR			
Suffix						
XXX (i.e., 2100) - Indicates Factory-installed Accessory (See page 12)						

Ratings for QOU Miniature Circuit Breakers

When designing an electrical distribution system, overcurrent protective devices are generally selected based on performance requirements. Factors influencing this selection include system voltage, continuous current, interrupting rating and frequency.

QOU circuit breakers are selected by their ratings. A circuit breaker's rating must meet or exceed the parameters of the electrical system on which they are used.

Voltage Rating

A circuit breaker can be rated for alternating current (ac) or direct current (dc) or both. The established voltage rating of a circuit breaker is based on design parameters such as clearance of current carrying parts and dielectric withstand tests both through air and over surfaces. Voltage ratings indicate the maximum voltage for the electrical system on which the circuit breaker can be applied.

The circuit breaker must have a voltage rating greater than or equal to the system voltage. When a circuit breaker clears an overcurrent, it does so in two steps: First, the current sensing system identifies the overcurrent and releases the tripping mechanism. This results in a parting of the contacts. Then the circuit breaker must extinguish the voltage arc across the contacts. If the circuit breaker has the correct voltage rating, it can efficiently extinguish this voltage arc. QOU miniature circuit breakers are rated in the following UL 489 voltages, as shown in Table 3:

- 120/240 Vac
- 240 Vac
- 48 Vdc
- 60 Vdc
- 277 Vac for QYU, UL 1077 recognized supplementary protector only (not a branch circuit breaker)

QOU Miniature Circuit Breakers and Switches Application Information

Interrupting Rating

The interrupting rating of a circuit breaker is the highest current at rated voltage that the circuit breaker is intended to interrupt under standard test conditions. Circuit breakers must be chosen with interrupting ratings equal to or greater than the maximum available short-circuit current at the point where the circuit breaker is applied in the system (See Table 3).

Table 3: Interrupting Rating

Circuit Breaker Type	No. of Poles	Ampere Rating	UL Listed Interrupting Rating—RMS Sym. Amperes				
			AC Volts			DC Volts ¹	
			120/240	240	277	48	60
QOU	1	10–30	NA	NA	5 kA		
		10–70	10 kA	NA	NA	5 kA	NA
		80–100	10 kA	NA	NA	NA	5 kA
	2	10–70	10 kA	NA	NA	5 kA	NA
		80–125	10 kA	NA	NA	NA	5 kA
	3	10–70	NA	10 kA	NA	5 kA	NA
80–100		NA	10 kA	NA	NA	5 kA	
QOU-H	2	15–30	NA	10 kA	NA	5 kA	NA
QOU-VH	2	15–60	22 kA	NA	NA	5 kA	NA

NA = Not Applicable

¹ DC ratings do not apply to circuit breakers rated for 10 A

Continuous Current Rating

The continuous current rating of a circuit breaker is defined by the National Electrical Manufacturers Association (NEMA) as: “The maximum direct current or rms current, in amperes, at rated frequency which a device or assembly will carry continuously without exceeding the specified limits of observable temperature rise.” Sometimes referred to as the ampere rating or handle rating of the circuit breaker, the continuous current rating relates to the system current flow under normal conditions.

UL Standard 489 states that circuit breakers must carry 100% of their continuous current rating indefinitely (without tripping) at 104° F (40° C) in free air. QOU circuit breakers should be applied, per the NEC, to carry 80% of their continuous current ratings in the intended enclosure. The continuous current rating is indicated on the handle of each circuit breaker. See Table 1.

Switching Duty

The switching duty (SWD) listing applies only to 15 A and 20 A circuit breakers rated at 277 Vac or less. The circuit breakers are subjected to specified temperature rise tests at predetermined periods during the endurance operations.