QOU Miniature Circuit Breakers and Switches Application Information

Catalog Number								
	One-Pole		Two-Pole			Three-Pole	Terminal	
Rating	120/240 Vac		120/240 Vac 240 Vac		120/240 Vac	240 Vac	Lug Wire Size (AWG)	
	10K AIR 22K AIR		10 K AIR		22K AIR	10K AIR		
10 A	QOU110	—	QOU210	—		QOU310		
15 A	QOU115*	QOU115VH	QOU215*	QOU215H*	QOU215VH	QOU315*		
15 A	QOU115HM* [†]	—	—	—		—		
20A	QOU120*	QOU120VH	QOU220*	QOU220H*	QOU220VH	QOU320*		
20 A	QOU120HM* [†]	—	—	—		—		
25 A	QOU125*	QOU125VH	QOU225*	QOU225H*	QOU225VH	QOU325*	1—#14–#2	
30 A	QOU130*	QOU130VH	QOU230*	QOU230H*	QOU230VH	QOU330*	Cu or Al	
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 [‡]		
80 A	QOU180 [‡]	_	QOU280 [‡]	_	_	QOU380 [‡]	1 #10 #0/0	
90 A	QOU190 [‡]	_	QOU290 [‡]	—	—	QOU390 [‡]	1—#12-#2/0	
100 A	QOU1100 [‡]	_	QOU2100 [‡]	_	_	QOU3100 [‡]	Cu or Ai	
125 A	_	_	QOU2125 [‡]	_	_	—		
Switch—60 Amperes Max.—240 Vac				QOU200		QOU300	1—#14–#2	
Switch—100 Amperes Max.—240 Vac				QOU2000 [‡]		QOU3000 [‡]	1 #10 #0/0	
Switch—125 Amperes Max.—240 Vac			QOU20001 [‡]		QOU30001 [‡]	1-#12-#2/0		

Table 1: Selection Data

* 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.

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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.

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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.

Typical Catalog Number:

Table 2:Catalog Numbers

	QO	U	2	30	н	210
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	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-installe	ed Accessory (See page	e 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)

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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).

Circuit	No. of Poles	Ampere Rating	UL Listed Interrupting Rating—RMS Sym. Amperes					
Breaker			AC Volts			DC Volts ¹		
Туре	1 0100	itanig	120/240	240	Appring Rating—RMS Sym. Ampoint DC Vol 277 48 5 kA 0 NA 5 kA NA 5 kA	60		
	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	
QOU	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	

Table 3: Interrupting Rating

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.

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DIMENSIONS



1 & 2 pole 10A - 70A and 3 pole 10A -60A QOU Circuit Breakers

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80A - 125A Circuit Breakers

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