F-Series Circuit Breaker

The F-Series hydraulic/magnetic high amperage circuit breakers are designed to handle high current applications in extremely hot and/or cold locations. Due to its time-proven hydraulic/magnetic design, the F-Series load sensing mechanism is insensitive to changes in ambient or enclosure temperature, providing a consistent trip point over temperatures ranging from -40°C to +85°C. Additionally, the F-Series circuit breakers come with a choice of overload time delays, making them ideal for critical applications having inductive loads.

Further, the F-Series breakers are available up to 700A and an optional 25 millivolt metering shunt construction provides a safe method for monitoring current flowing through the breaker by simply connecting a meter with light gauge wire to the appropriate terminals located on the shunt housing at the rear of the breaker. Applications can be customized by measuring and displaying percentage of current, watts or safe/danger zones.

Features:

- AC ratings to UL 489
- DC voltage ratings up to 700A with metering shunt section
- Consistent trip point over temperatures ranging from -40°C to +85°C
- Optional 25 millivolt metering shunt construction



Applications:

- Ideal for applications under extreme temperatures
- Higher Amperage Applications
- Battery Disconnect Systems
- Solar Power Systems
- Military



Electrical

Maximum Voltage **Current Ratings**

125VDC, 277VAC

Standard current coils: 100, 125, 150, 175, 225, 250 amps. 300, 350, 400, 500, 600, 700 amps available as parallel pole

construction.

Auxiliary Switch Rating

SPDT; 10.1 Amps @ 250VAC, 1.0 Amps @ 65VDC, 0.5 Amps @ 80VDC 0.1 Amps @ 125VAC (with

gold contacts).

Insulation Resistance

Minimum: 100 Megohms at 500

VDC

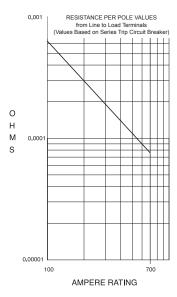
Dielectric Strength

1960 VAC, 50/60 Hz for one minute between all electrically isolated terminals, except 2500 VAC for one minute between alarm/aux. switch and main terminals with contacts in open and closed position. F-Series circuit breakers comply with the 8mm spacing & 3750VAC 50/60 Hz dielectric requirements from hazardous voltage to operator accessible surfaces, between adjacent poles and from main circuits to auxilary circuits per Publications EN 60950 and VDE 0805.

Resistance, Impedance

Values from Line to Load Terminal based on Series Trip Circuit

Breaker.



CURRENT (AMPS)	TOLERANCE (%)		
100 - 700	50%		

Mechanical

Endurance 4000 ON-OFF operations with rated

Current & Voltage & 4000 operations with no load (8000 operations total) @ 5 per minute. Parallel Pole construction: 1000 operations with rated Current and

Voltage @ 5 per minute.

Trip Free All F-Series Circuit Breakers will trip

on overload, even when the actuator is forcibly held in the ON

position.

Trip Indication The operating actuator moves

> positively to the OFF position when an overload causes the circuit

breaker to trip.

Physical

Weight

Number of Poles 1 - 3 Poles Note: Ratings over 250

Amps only available with parallel

pole.

Series (with or without auxiliary Internal Circuit Config.

switch), Switch Only (with or without

auxiliary switch).

Available Accessories Factory installed: DC Current

Metering Shunt (25 mV @lr) Varies depending on construction.

Consult factory.

Standard Colors Housing - Black; Actuator- Black or

White with contrasting ON-OFF

legend.

Environmental

Designed and tested in accordance with requirements of specification MIL-PRF-55629 & MIL-STD-202 as follows:

Shock Withstands 100 Gs, 6ms, sawtooth

> while carrying rated current per Method 213, Test Condition "I". Instantaneous and ultra-short curves tested @ 90% of rated

current.

Vibration Withstands 0.060" excursion from

> 10-55 Hz, and 10 Gs 55-500 Hz, at rated current per Method 204C, Test Condition A. Instantaneous and ultrashort curves tested at 90%

of rated current.

Method 106D; ten 24-hour cycles @ Moisture Resistance

+ 25°C to +65°C, 80-98% RH.56

days @ +85°C, 85% RH.

Salt Spray Method 101, Condition A (90-95%

RH @ 5% NaCl Solution, 96 hrs).

Thermal Shock Method 107D, Condition A (Five cycles @ -55°C to +25°C to +85°C

to +25°C).

-40° C to +85° C Operating Temperature

*Manufacturer reserves the right to change product specification without prior notice

Electrical Tables

Table A: Lists UL Listed (489) and CSA Certified (C22.2 No. 5.1-M) configurations and performance capabilities as a Molded Case Circuit Breaker

F SERIES TABLE A : UL489 LISTED BRANCH CIRCUIT BREAKERS							
	,	VOLTAGE			INTERRUPTING		
				RATING	CAPACITY (AMPS)		
CIRCUIT CONFIGURATION	MAX RATING	FREQUENCY	PHASE	FULL LOAD AMPS	UL / CSA 1 - 3 POLES	TUV ² 1 or 2 POLES	
SERIES	125	DC	-	50 - 250	50,000	25,000	
	120 / 240 ¹	0 / 240 ¹ 50 / 60 1		100 - 250	10,000		
	277	50 / 60	1	100 - 250	10,000		
	208Y / 120	50 / 60	3	100 - 250	10,000		

Notes:

- 120/240V rating available in 2 or 3 poles. In a 3 pole construction the center pole is Neutral. TUV constructions are not available with AC ratings.

Table B: Lists UL Listed configurations and performance capabilities as Circuit Breakers for use in Communications Equipment (Guide DITT, File E189195), under UL489A

F-SERIES TABLE B : UL489 LISTED BRANCH CIRCUIT BREAKERS						
CIRCUIT CONFIGURATION	VO	LTAGE	CURRENT	INTERRUPTING CAPACITY (AMPS)		
	MAX. RATING FREQUENC		RATING			
		FREQUENCY	FULL LOAD AMPS	WITHOUT BACKUP FUSE		
SERIES	125	DC	251 - 700	50,000		

Agency Certifications

UL Listed

UL 489 Circuit Breakers, Molded Case (Guide DIVQ, File E129899) Complies with the requirements of the CSA Standard for Molded

Case Circuit Breakers, CANCSA- C22.2 No. 5.1 -M

UL 489A Circuit Breakers for Use in Communications Equipment (Guide DITT, File E189195)

TUV Certified

IEC 60947-2 Low Voltage Switchgear and Control Gear under TUV License No. R72031058



1 SERIES

2 ACTUATOR

Handle, one per pole

Mid-Trip Handle, one per pole

Mid-Trip Handle, one per pole & Alarm Switch

3 POLES

One 2 Two Three

4 CIRCUIT

Switch Only (no coil) Series Trip (current) Series Trip (voltage)

Parallel Pole Construction:

Metering Shunt N^{3,4} Switch Only with Meterina Shunt Series Trip (Current) Q³

w/o Aux Switch

(Gold Contacts) S.P.S.T., 0.093 Q.C. Term.

S.P.S.T., 0.139 Solder Lug S.P.S.T., 0.110 Q.C. Term. (Gold Contacts)

Series Trip (Current) with

Switch Only

5 AUXILIARY/ALARM SWITCH5

S.P.D.T., 0.110 Q.C. Term. S.P.D.T., 0.139 Solder Lug S.P.D.T., 0.110 Q.C. Term.

(Gold Contacts)

S.P.S.T., 0.187 Q.C. 8

Terminals S.P.D.T., 0.187 Q.C.

Terminals. S.P.S.T., 0.093 Round QC

Terminals.

6 FREQUENCY & DELAY

DC Instantaneous DC Ultra Short

DC Short

S.P.D.T., 0.093 Round Q.C. Terminals

DC 50/60Hz, Switch Only

DC Medium 16 DC Long AC Short 24 AC Medium

AC Long

7 CURRENT RATING (AMPERES)

CODE AMPERES 810 912 125.00

835⁸ 350.00 **840**⁸ 400.00 **860**⁸ 600.00 820 **870**⁸ 700.00 922 225.00 **845**⁸ 450.00 815 150.00 825 250.00 175.00 830⁸ 300.00 **850**⁸ 500.00 917

OR VOLTAGE COIL (VOLTS, MIN. TRIP RATING)7

CODE AMPERES

A06 6 DC, 5 DC A24 24 DC, 20 DC A65 65 DC, 55 DC 12 DC, 10 DC A32 B25 125 DC, 100 DC A48 48 DC 40 DC A18 18 DC. 15 DC 106 6 AC, 5 AC

8 TERMINAL

Max Rating Back Connected (Front Mounted Only) 3/8-16 Stud **2**14 3/8-16 Screw, Line & Load 700A **5**¹⁴ 3/8-16 Short Stud 250A Front Connected (Back Mounted Only)¹¹ Max Rating Box Wire Connector, Line & Load 700A 3/8-16 Screw, Line & Load 700A

9 ACTUATOR COLOR & LEGEND^{12,13}

Actuator Color ON-OFF Dual **Marking Color** White A Black 1 D Black White

10 MOUNTING

Front Mounting Inserts 10-32 В ISO M5

Back Mounting Inserts 10-32 screw clearance holes

10-32 screw clearance holes

11 MAXIMUM APPLICATION RATING

	VOLTAGE	CURRENT			
В	125 VDC	700A			
C ¹⁵	120/240	250A			
F	277 VAC	250A			
7 ¹⁶	120/208 VAC	250A			

12 AGENCY APPROVAL

No approvals

G UL 489 Listed & CUL Certified

UL 489 Listed, CUL Certified & TUV Certified UL489A (Telecom) Listed

Notes

3

For 100 to 250 amps, select Current Code 825. For 300-400 amps, select Current Code 840. For 450-700 amps, select Current Code 870.

Available with Frequency and Delay code 10 or 20 only, and are not rated for continuous duty. Delay 10 and 20 are only available with voltage coils.

3 Codes M, N, P & Q (Parallel Poles) are supplied with factory installed Bus Bar on Line and Load.

4 Metering terminals are female pin type, ref. Molex part number 02-09-1101, model 1180-T 4 1189-T

Auxiliary Switch breakers are only available with Series Trip and Switch Only circuits. On multi-pole breakers, one Auxiliary Switch is supplied, mounted in the extreme right pole per figure A. Back-Mounted breakers require special mounting provisions when an Auxiliary Switch is specified.

Available with parallel pole construction (circuit codes P and Q, and breakers with circuit codes M and N). 6

Frequency and delay code 10 is only available with Voltage Coils. Voltage Coils are not rated for continuous duty.

Ratings over 250 amps are only available with Agency Approval code T (UL489A) and are Parallel Pole configuration (circuit codes M, N, P and Q.) 300-450 amp ratings are available on two pole breakers. 500-700 amp ratings are available on three pole

Per UL requirement, an "Anti-Flash Over Barrier" is supplied between poles on multipole breakers with 3/8 - 16 stud terminals (Terminal Code 1)

Front connected breakers can also be front mounted by utilizing the supplied front panel mounting inserts. Terminal connections must be made before mounting.

Box Wire connector will accept #6 through 250 MCM copper wire.

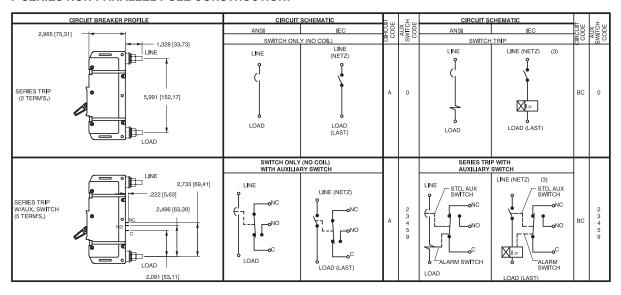
Agency codes G & T must have ON-OFF or dual legends. Agency code J must have

Other colors available. Consult factory. 13

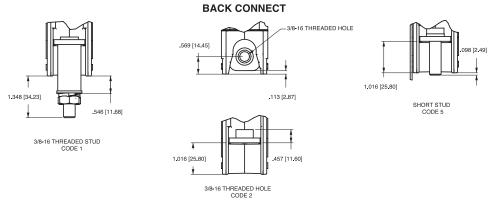
Terminals 2,4 & 5 are shipped without terminal hardware. 2 or 3 Pole Circuit Breaker Required for 120/240 VAC Rating.

3 Pole Circuit Breaker Required for 120/208 VAC Rating.

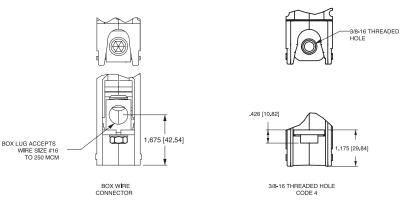
F SERIES NON-PARALLEL POLE CONSTRUCTION:



TERMINAL DETAILS

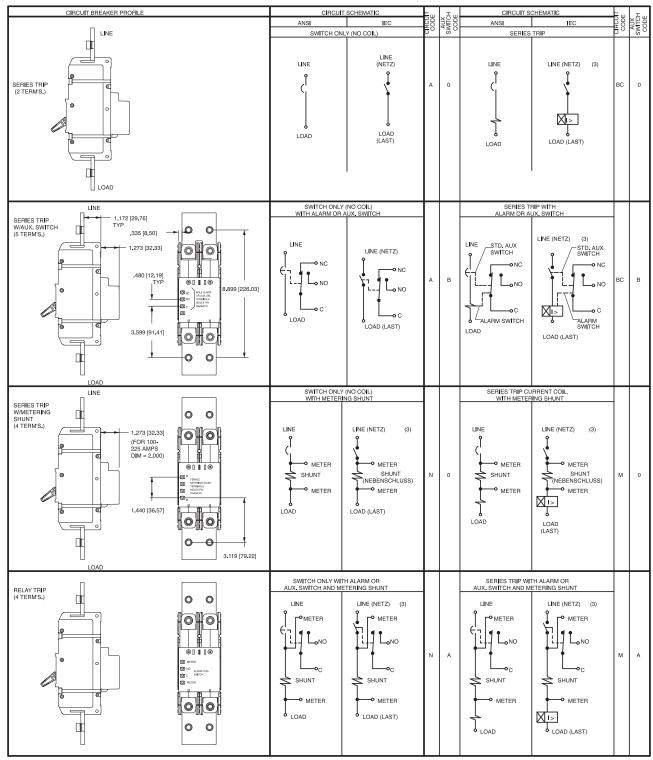


FRONT CONNECT



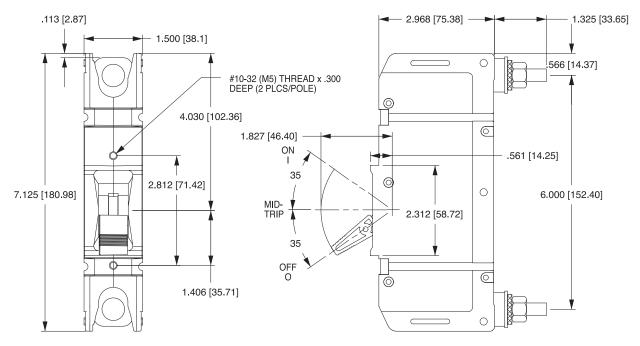
- All dimensions are in inches [millimeters].
 Tolerance ±.020 [.51] unless otherwise specified.

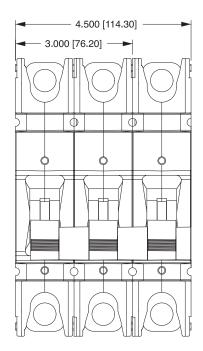
F-SERIES PARALLEL POLE CONSTRUCTION:



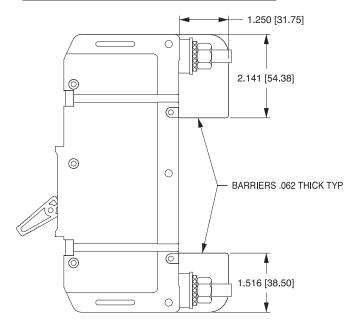
- All dimensions are in inches [millimeters].
 Tolerance ±020 [.51] unless otherwise specified.

SERIES TRIP BACK CONNECT (STUD TERMINALS SHOWN)



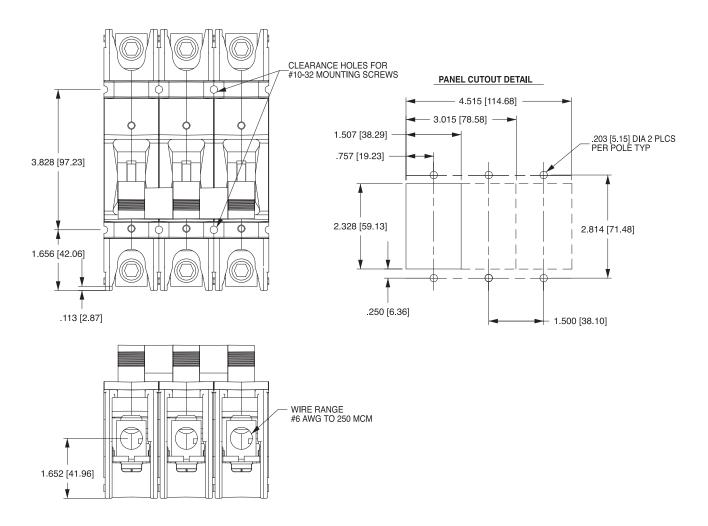


MULTIPOLE SERIES TRIP, SHOWING TERMINAL BARRIER

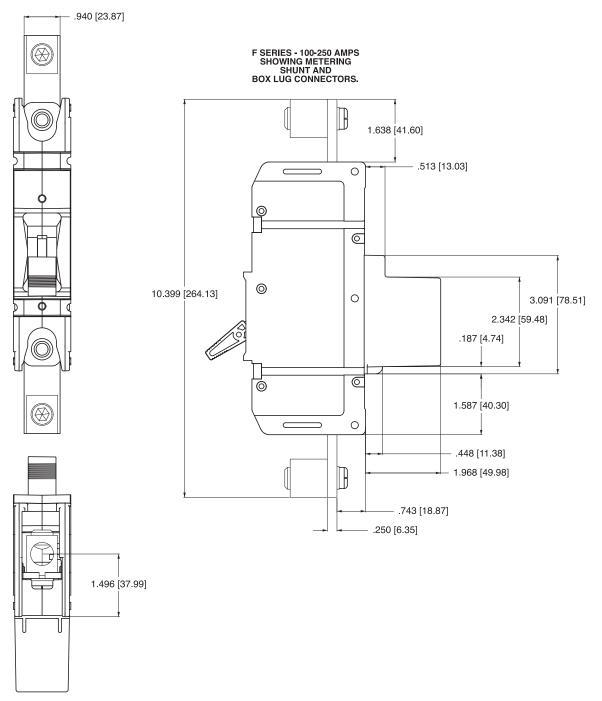


- All dimensions are in inches [millimeters].
 Tolerance ±.020 [.51] unless otherwise specified.

SERIES TRIP FRONT CONNECT (BOX LUG TERMINALS SHOWN)

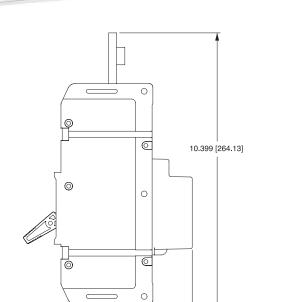


- All dimensions are in inches [millimeters].
 Tolerance ±.020 [.51] unless otherwise specified.

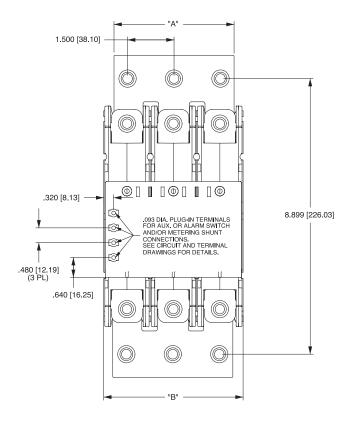


F-Series breakers are available up to 700A, and are also available with a 25 millivolt metering shunt construction. This optional construction provides a safe method for monitoring current flowing through the breaker by simply connecting a meter with light gauge wire to the appropriate terminals located on the shunt housing at the rear of the breaker. You can customize the application by measuring and displaying percentage of current, watts or safe/danger zones.

- All dimensions are in inches [millimeters].
 Tolerance ±.020 [.51] unless otherwise specified.



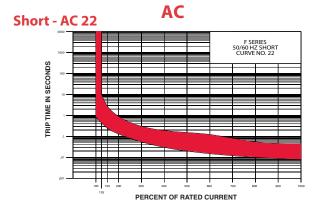
1.273 [32.33]



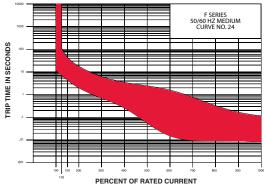
F-SERIES PARALLEL POLE 250-700 AMPS SHOWING FRONT CONNECT SCREW TERMINALS

- All dimensions are in inches [millimeters].
 Tolerance ±.020 [.51] unless otherwise specified.

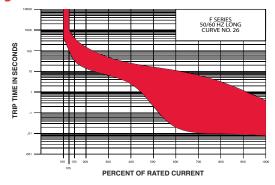
F-SERIES TIME DELAY VALUES									
	PERCENT OF RATED CURRENT								
	Delay	100%	125%	150%	200%	400%	600%	800%	1000%
TDID	11	No Trip	.013125	.010070	.008032	.006020	.005020	.004020	.004020
TRIP TIME SECONDS	12	No Trip	.475 - 10.0	.275 - 2.80	.140850	.030190	.015125	.010050	.008038
	14	No Trip	10.0 - 110	6.00 - 40.0	2.50 - 15.0	.500 - 3.00	.180 - 1.00	.010280	.008080
	16	No Trip	110 - 1000	60.0 - 400	22.0 - 150	4.00 - 25.0	1.00 - 5.50	.010 - 1.80	.008390
	22	No Trip	.700 - 12.0	.350 - 4.00	.130 - 1.30	.027220	.008130	.004090	.004045
	24	No Trip	10.0 - 160	6.00 - 60.0	.220 - 20.0	.300 - 3.00	.050 - 1.30	.007500	.005060
	26	No Trip	50.0 - 700	32.0 - 350	10.0 - 90.0	1.50 - 15.0	.500 - 7.00	.020 - 3.00	.006 - 2.00

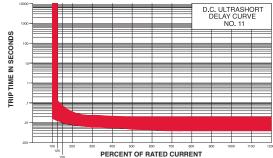






Long - AC 26

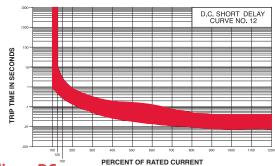




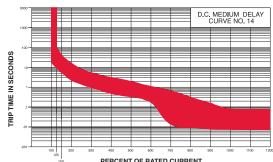
DC

Short - DC

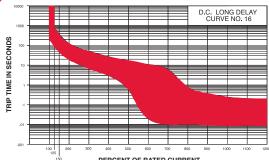
Ultrashort - DC



Medium - DC



Long - DC



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