

PowerPact™ M-, P- and R-Frame, and Compact™ NS630b–NS3200 Circuit Breakers

Section 1—General Information

Enclosure Sizes

All type ET electronic trip UL/IEC M-frame, P-frame and R-frame circuit breakers are available as standard rated circuit breakers. Micrologic electronic trip UL/IEC circuit breakers are also available in 100% rated constructions. Because the additional heat generated when applying circuit breakers at 100% of continuous current rating, the use of specially designed enclosures and 90°C (194° F) rated wire sized per the 75°C (167° F) NEC chart is required.

Circuit breakers with 100% rating can also be used in applications requiring only 80% continuous loading.

Table 5: Minimum Enclosure Sizes for Fixed-Mounted Circuit Breakers

Circuit Breaker Rating	Enclosure Dimensions (h x w x d) in/[mm]		Ventilation Area			
	3P Circuit Breaker	4P Circuit Breaker	Top		Bottom	
M-Frame, ≤ 800 A, Standard Rated	51.9 x 20.25 x 7.75 [1318.3 x 514.4 x 196.9]	51.9 x 23.01 x 7.75 [1318.3 x 584.4 x 196.9]	—	—	—	—
P-Frame, ≤ 800 A, 100% Rated P-Frame, ≤ 1200 A, Standard Rated	51.9 x 20.25 x 7.75 [1318.3 x 514.4 x 196.9]	51.9 x 23.01 x 7.75 [1318.3 x 584.4 x 196.9]	—	—	—	—
P-Frame, ≤ 1200 A, 100% Rated	62.25 x 23 x 14.75 [1581.2 x 584.2 x 374.7]	62.25 x 25.76 x 14.75 [1581.2 x 654.2 x 374.7]	16.5 in.	10,645 mm	16.5 in.	10,645 mm
R-Frame, Standard Rated ¹	30 x 21 x 7 [762 x 533 x 178]	30 x 25.5 x 7 [762 x 648 x 178]	—	—	—	—
R-Frame, 100% Rated ¹	30 x 21 x 7 [762 x 533 x 178]	30 x 25.5 x 7 [762 x 648 x 178]	40.25 in.	26,000 mm	40.25 in.	26,000 mm

¹ RLTB or RL3TB kits may extend beyond end of enclosure when using minimum enclosure size.

Operating Conditions

Temperature

To meet the requirements of the UL489 Standard, molded case circuit breakers are designed, built and calibrated for use on 50/60 Hz ac systems in a 40°C (104°F) ambient environment. Electronic trip circuit breakers, however, are designed to react only to the magnitude of the current flowing through the circuit breaker and are inherently ambient insensitive. Both UL/IEC and IEC-only circuit breakers may be operated at temperatures between -25°C and +70°C (-13°F and 158°F). For temperatures other than 40°C (104°F), the circuit breakers must be re-rated as shown.

Table 6: Temperature Derating Values per ANSI C37.20.1

Maximum Ambient Temperature											
°F	140	122	104	86	77	68	50	32	14	-4	-22
°C	60	50	40	30	25	20	10	0	-10	-20	-30
Current	0.83	0.92	1.00	1.07	1.11	1.14	1.21	1.27	1.33	1.39	1.44

Altitude

Circuit breakers are suitable for use at altitudes up to 13,100 ft. (4000 m). For altitudes higher than 6560 ft. (2000 m), circuit breakers must be derated as shown.

Table 7: Altitude Derating Values Per ANSI C37.20.1 Table 10

Altitude	≤ 6,600 ft. (≤ 2,000 m)	8,500 ft. (2,600 m)	13,000 ft. (3,900 m)
Voltage	1.00	0.95	0.80
Current	1.00	0.99	0.96

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Extreme Atmospheric Conditions

PowerPact circuit breakers have successfully passed the tests defined below for extreme atmospheric conditions.

Dry cold and dry heat:

- IEC 68-2-1—Dry cold at -55°C
- IEC 68-2-2—Dry heat at +85°C

Damp heat (tropicalization)

- IEC 68-2-30—Damp heat (temperature 55°C and relative humidity of 95%, condensing)
- IEC 68-2-52 level 2—Salt mist

The materials used in the PowerPact circuit breakers will not support the growth of fungus and mold.

Vibration

PowerPact circuit breakers meet IEC 60068-2-6 Standards for vibration.

- 2 to 13.2 Hz and amplitude 0.039 in. (1 mm)
- 13.2 to 100 Hz constant acceleration

Storage Temperature

Circuit breakers with trip units without LCD displays may be stored in the original packaging at temperatures between -58°F (-50°C) and 185°F (85°C). For circuit breakers with trip units with LCD displays, this range is -40°F (-40°C) to 185°F (85°C).

Trip System

The trip system causes the circuit breaker to open automatically under overload, short-circuit or equipment ground-fault conditions. Electronic trip circuit breakers give the customer more versatility to achieve coordination with features such as adjustable instantaneous pickup and high withstand ratings.

The type ET and the Micrologic trip systems consist of current sensors, a microprocessor-based trip unit, and a tripping coil. The tripping coil is a flux transfer solenoid that requires no external power source. All type ET and Micrologic protective functions are completely fault powered.

Micrologic Trip System

Features found in Micrologic™ electronic trip circuit breakers, such as universally interchangeable rating plugs, adjustable long-time pickups and 100% ratings also provide capacity for future growth.

The integral equipment ground-fault sensing capabilities available with Micrologic trip systems mean that there are fewer parts and pieces to purchase, mount and wire. These capabilities include integral ground-fault protection for equipment, which causes the circuit breaker to trip when a ground fault is detected, as well as integral ground-fault alarm, which does not trip the circuit breaker but sends an alarm when a ground fault is detected.

Certain Micrologic trip systems also offer the customer true power management system solutions through communication. These trip units can communicate with other circuit breakers in the system and also with a power monitoring system. Communication is by Modbus® and does not require proprietary software.

Communication between trip units allows zone-selective interlocking (ZSI) between circuit breakers at different levels in the system. ZSI reduces fault stress by allowing the upstream circuit breaker closest to the fault to ignore its preset delay time and trip without any intentional delay on a short circuit or ground fault. For more information on ZSI, see data bulletin *Reducing Fault Stress with Zone-Selective Interlocking*.

