

NRBM Series Circuit Protectors






Variety of rated currents: 1A to 50A

Widely employed for protection of PC power circuits and large current circuits of welding machines.

NRBM is the largest in the rated current among the IDEC circuit protector series.

- Electromagnetic trip, not affected by ambient temperature
- Safe trip-free mechanism
- Available with auxiliary contact and alarm contact
- Available with inertia delay
- Vibration-proof design

This product is recognized by Underwriters Laboratories under UL1077 as a "Supplementary Protector."

Applicable Standards	Mark	Certification Organization / File No.
UL1077 CSA C22.2 No. 235		UL/c-UL recognized File No. E68029
EN60934 (VDE0642)		VDE No. 113434
EN60934		EU Low Voltage Directive
GB17701		CCC No. 2005010307151788
Electrical Appliance and Material Safety Law Technical Standard		JET



For details, see the list of standard certified products in the back of this catalog.

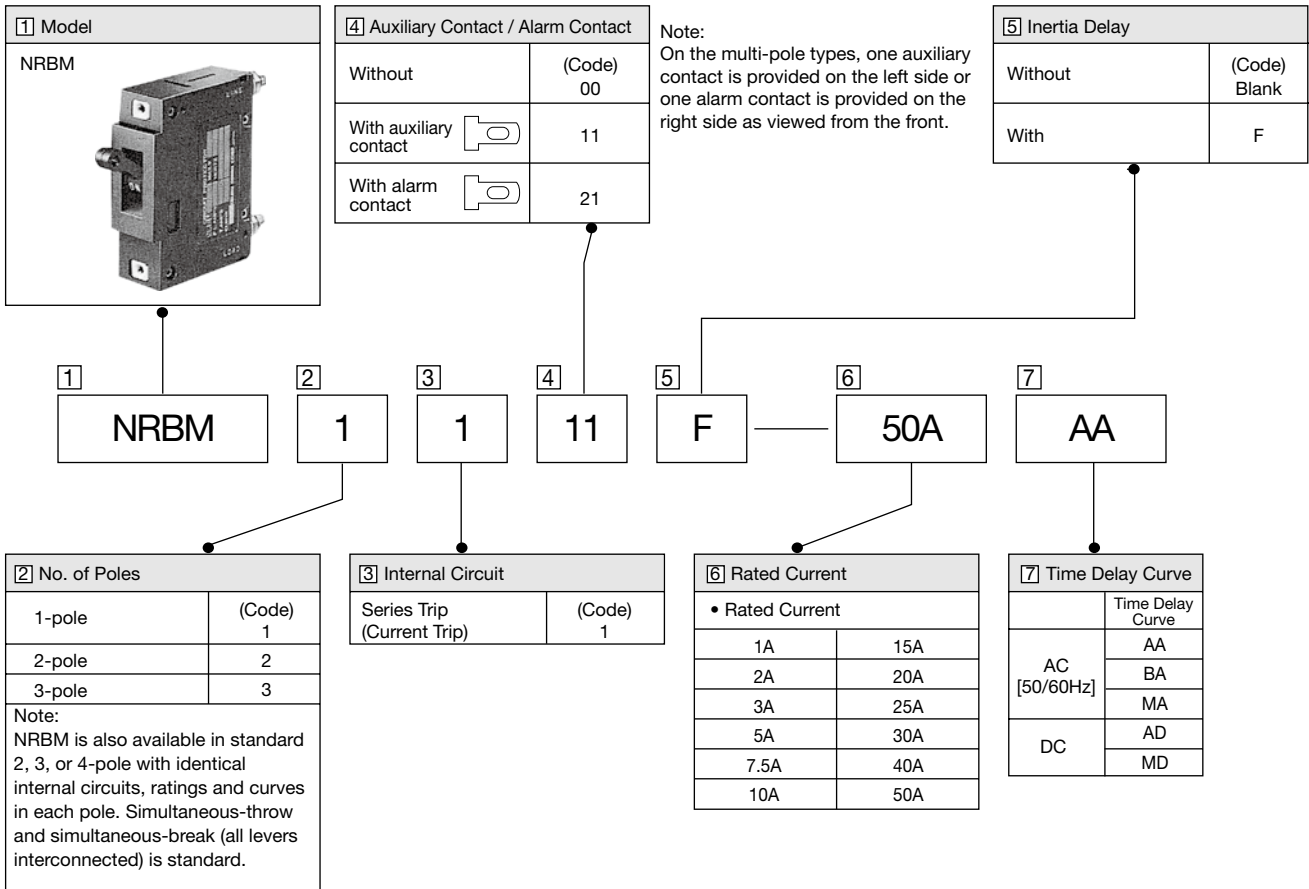
Specifications

Model	NRBM
Operator	Lever
Protection Method	Hydraulic-magnetic tripping system
Internal Circuit	Series trip (current trip) Series trip with auxiliary contacts Series trip with alarm contacts
No. of poles	1, 2, 3 poles
Rated Voltage	250V AC 50/60 Hz, 65V DC
Minimum Applied Load	24V AC/DC, 100 mA (reference value)
Rated Current	Current trip: 1A, 2A, 3A, 5A, 7.5A, 10A, 15A, 20A, 25A, 30A, 40A, 50A
Rated Interrupting Current	250V AC 50/60Hz, 65V DC, 1000A
Auxiliary Contact Alarm Contact	SPDT microswitch 250V AC 5A 50V DC 1A (resistive load)
Reference Temperature	+25°C
Operating Temperature	-40 to +85°C (no freezing)
Storage Temperature	-40 to +90°C (no freezing)
Operating Humidity	45 to 85% RH (no condensing)
Storage Humidity	45 to 85% RH (no condensation)
Insulation Resistance	100 MΩ minimum (500V DC megger)
Dielectric Strength	2000V AC for 1 minute (between live part and ground, between terminals of different poles, between terminals of the same poles when main contacts are open, between main circuit and auxiliary contact)
Vibration Resistance	100 m/s ² (10 to 55 Hz)
Shock Resistance	1000 m/s ²
Life	10,000 operations minimum (6 operations per minute)
Terminal Style	Main terminal: M5 stud screw Auxiliary contact and alarm contact: Tab terminal #80
Weight (Approx.)	1-pole: 100g, 2-pole: 200g, 3-pole: 300g

Note: auxiliary/alarm contact: Tab #80 terminal

- Do not use the NRBM circuit protectors in environments where they are exposed to extreme temperature, humidity, dust, corrosive gases, vibration, shock, or in a circuit where inrush current may be present, otherwise unnecessary operations and damage may occur.

Part No. Development



NRBM (Lever)


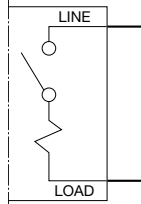
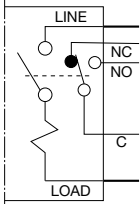
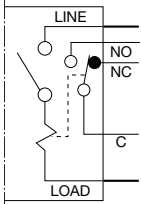
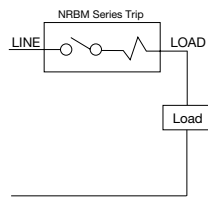
Specify a rated current and time delay curve in place of [6] [7].

Package Quantity: 1

Internal Circuit	No. of Poles	Inertia Delay	Auxiliary Contact Alarm Contact	Part No.	Code for Ordering	
					[6] Rated Current	[7] Time Delay Curve
Series Trip Current Trip	1	Without	Without	NRBM1100- [6] [7]	1A 2A 3A 5A 7.5A 10A 15A 20A 25A 30A 40A 50A	AA BA MA AD MD
			w/Auxiliary Contact	NRBM1111- [6] [7]		
			w/Alarm Contact	NRBM1121- [6] [7]		
		With	Without	NRBM1100F- [6] [7]		
			w/Auxiliary Contact	NRBM1111F- [6] [7]		
			w/Alarm Contact	NRBM1121F- [6] [7]		
	2	Without	Without	NRBM2100- [6] [7]		
			w/Auxiliary Contact	NRBM2111- [6] [7]		
			w/Alarm Contact	NRBM2121- [6] [7]		
		With	Without	NRBM2100F- [6] [7]		
			w/Auxiliary Contact	NRBM2111F- [6] [7]		
			w/Alarm Contact	NRBM2121F- [6] [7]		
3	Without	Without	NRBM3100- [6] [7]			
		w/Auxiliary Contact	NRBM3111- [6] [7]			
		w/Alarm Contact	NRBM3121- [6] [7]			
	With	Without	NRBM3100F- [6] [7]			
		w/Auxiliary Contact	NRBM3111F- [6] [7]			
		w/Alarm Contact	NRBM3121F- [6] [7]			

NRBM series Circuit Protectors

Internal Circuits

Shape	Series Trip (Current Trip)	Series Trip (Current Trip) With Auxiliary Contact	Series Trip (Current Trip) With Alarm Contact	Wiring Example
				

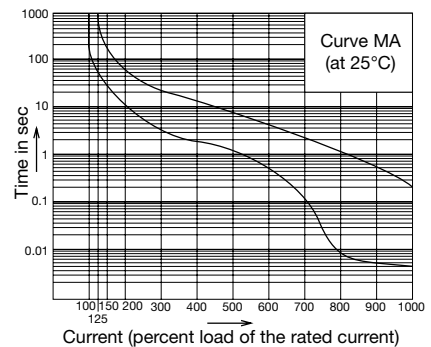
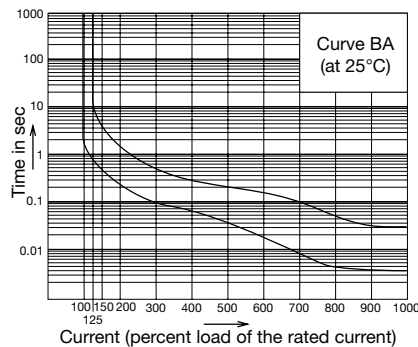
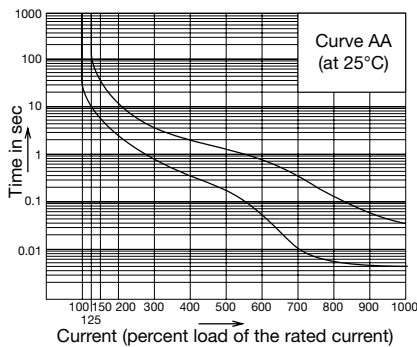
Overcurrent - Time Delay Characteristics (sec at 25°C)

Type	Time Delay Curve	Percent of Rated Current							
		100%	125%	150%	200%	400%	600%	800%	1000%
AC 50/60Hz	AA	No Trip	15-120	8-45	3-15	0.48-2.5	0.06-0.8	0.007-0.13	0.005-0.04
	BA	No Trip	0.75-10	0.45-3.5	0.22-1.3	0.045-0.22	0.012-0.12	0.005-0.06	0.004-0.03
	MA	No Trip	70-900	30-260	10-70	1.8-11	0.5-4	0.009-1.1	0.006-0.2
DC	AD	No Trip	10-130	6-55	2.6-20	0.5-3.5	0.14-1.4	0.008-0.7	0.005-0.35
	MD	No Trip	35-400	20-180	8-60	1.6-10	0.6-4.5	0.01-2	0.007-0.5

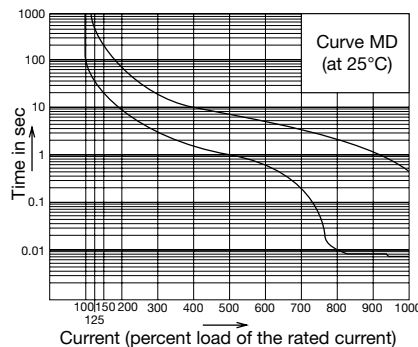
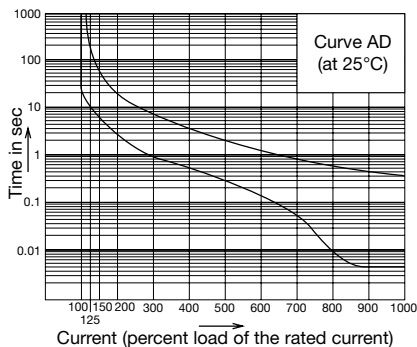
Note: Circuit protectors with inertia delay may have a slightly longer time delay at 600% or higher.

Time Delay Curves

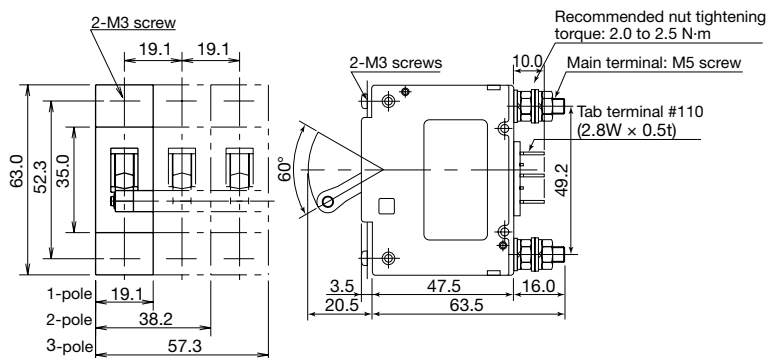
For AC



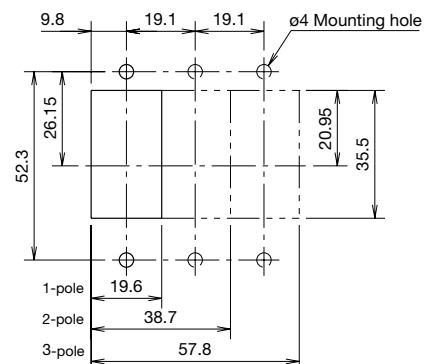
For DC



Dimensions



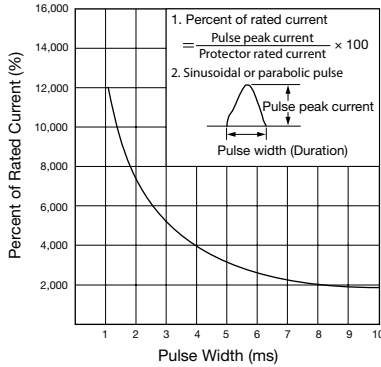
Mounting Hole Layout



All dimensions in mm.

Circuit Protector with Inertia Delay

Circuit protectors equipped with inertia delay do not respond to high inrush currents caused by transformer or lamp loads, but perform the specified interruption on the subsequent overcurrents.



Note: Inertia delay is designed not to trip on a pulse of 20 times the rated current (peak value) for a duration of 8 ms. See the above curve.

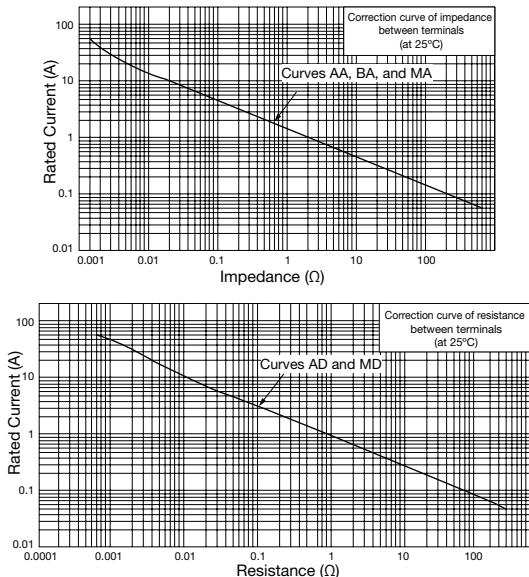
Impedance and Coil Resistance (at 25°C) (initial value)

Rated Current (A)	For AC 50/60Hz Impedance (Ω)	For DC Resistance (Ω)
	Curves AA, BA, and MA	Curves AD and MD
1	1.1	1
2	0.245	0.227
3	0.11	0.091
5	0.039	0.035
7.5	0.018	0.015
10	0.0124	0.0088
15	0.0065	0.005
20	0.0047	0.003
25	0.0032	0.0023
30	0.0031	0.0019
40	0.002	0.001
50	0.0016	0.0006

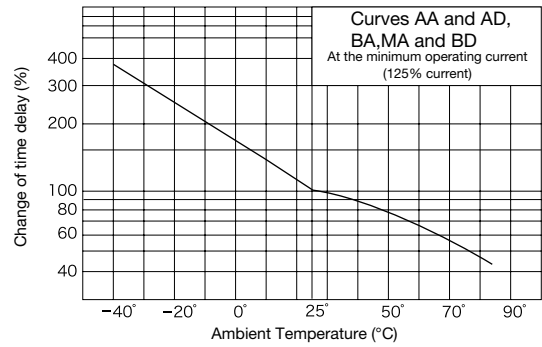
Note: Tolerance: ±25% (up to 20A), ±50% (25A or higher)

Voltage Drop due to Coil Resistance or Impedance

The internal resistance or impedance of a circuit protector tends to be larger for a smaller rated current. Therefore, when circuit protectors of a small rated current are used for a power-supply switch, voltage drop should be taken into consideration. Internal resistance also varies with time delay curves in spite of the same rated current, which should be also considered during installation.



Temperature Correction Curve



Time Delay Curve and Ambient Temperature

Since the NRBM series circuit protectors employ an electro-magnetic tripping system, the rated current (trip current) is not affected by ambient temperatures, but the time delay varies with the oil viscosity in the oil dash pot. Lower oil viscosity at higher temperatures results in shorter delay, whereas at lower temperatures the delay will be prolonged.

The time delay curves on the preceding page are at 25°C. With reference to these curves, time delays can be corrected.

Instructions

Panel Mounting Screw Length

Select a proper screw length according to the table.

Panel thickness (mm)	0.8	1.0	1.2	1.4	1.6	1.8	2.0	2.3	2.6	3.2
Without washer	(4)	(4)	5	5	5	5	5	6	6	6
With plain washer (0.5 mm thick)	5	5	5	5	6	6	6	6	6	(7)
With spring washer (0.7 mm thick)	5	5	5	5	6	6	6	6	6	7
With plain washer (0.5 mm thick) and spring washer (0.7 mm thick)	6	6	6	6	6	6	6	(7)	(7)	8

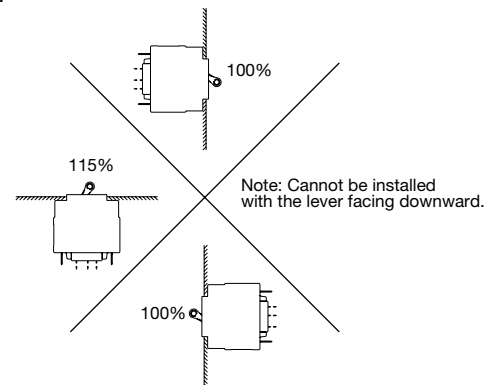
Note: Avoid using screws in the parenthesized lengths whenever possible.

M3 Screw Mounting

Tightening torque: 0.5 to 0.8 N·m minimum

Installation Angle

Designed to be mounted on a vertical surface in principle, the circuit protector must be mounted on a surface within 10° from a vertical plane. If the circuit protector is mounted on a horizontal surface or at any angle other than specified, the characteristics will be changed.



Overcurrent tripping method is hydraulic magnetic. Minimum operating currents vary with installation angle because operating currents are influenced by the weight of the iron core. With reference to the following figure, correct the rated current.

Multi-pole

Multi-pole such as 2- or 3-pole are assembled by IDEC. Because of their characteristics, 1-pole protectors cannot be combined to provide multi-pole.