

2.2 Electronic Motor Protection Relays

Series ET-N

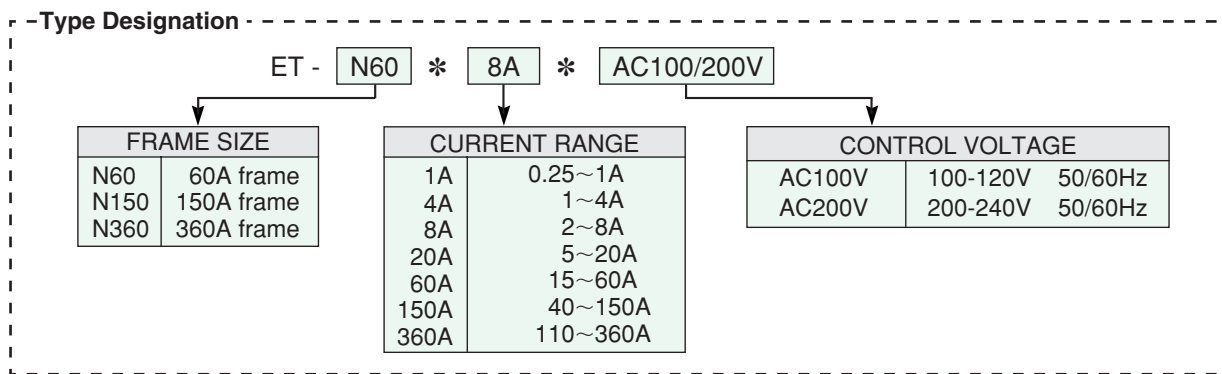


ET-N60 60A

The MITSUBISHI series ET-N relay is an excellent relay that can protect motors electrically. Those series ET-N relays have the following excellent features.

■ Features

- Selectable Protection Mode
 - Overload (including locked rotor condition)
 - Phase failure (including current unbalance)
 - Incorrect phase sequence
- Excellent Wide Current Range
- Easy Wiring
- Easy Setting and Maintainance
- Selectable Tripping Time at 600% of setting.
 - Quick trip (3s.)
 - Fast trip (5s.)
 - Medium trip (15s.)
 - Slow trip (30s.)
- Withstands High Overcurrent
- Fine Indication of Trip Mode
- Conformity to International Standards
- Can be mounted on 35mm rail (ET-N60)



■ Specifications

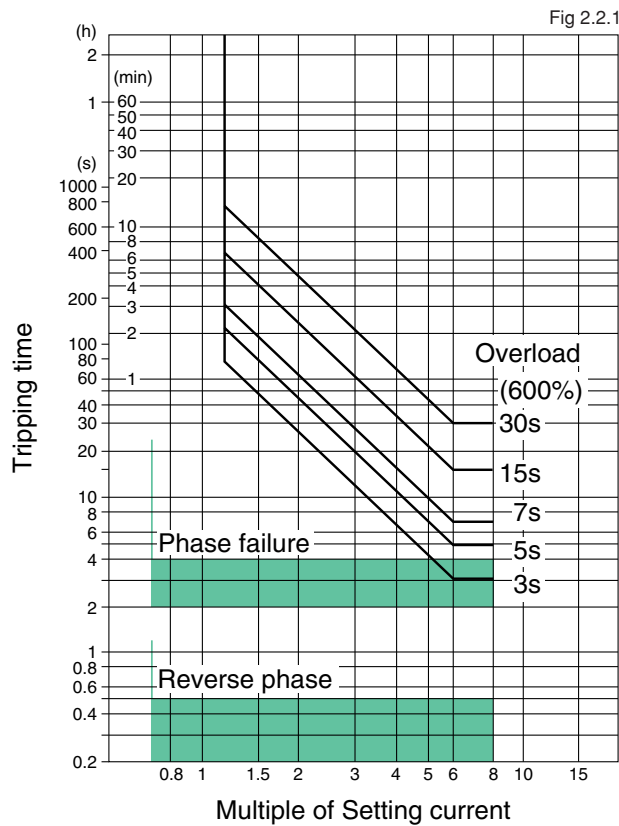
• Ratings and characteristics

Table 2.2.1

Frame size [Current range]			N60[1A]	N60[4A]	N60[8A]	N60[20A]	N60[60A]	N150[150A]	N360[360A]
Rated insulation voltage	VAC		690						
Adjustable setting range	A		0.25-1	1-4	2-8	5-20	15-60	40-150	110-360
Applicable motor capacity	200-240VAC	kW	0.03-0.2	0.2-0.75	0.4-1.5	1.5-4	3.7-11	11-37	30-90
	380-440VAC	kW	0.05-0.4	0.4-1.5	0.75-2.2	2.2-7.5	7.5-22	22-75	55-150
3-ph	200-240VAC	HP	1/16-1/4	1/4-1	1/2-2	2-5	5-15	15-50	40-125
	380-440VAC	HP	1/8-1/2	1/2-2	1-3	3-10	10-30	30-100	75-200
Rated operating current of aux. contacts	Category 120VAC	A	2						
	AC-15 240VAC	A	1						
Rated operating current of aux. contacts	Category 24VDC	A	1						
	DC-13 110VDC	A	0.2						
Permissible ambient temperature/humidity	°C/%RH		-10 to +55/45 to 85						
Control circuit consumption	VA		7.5 (AC100V)/15 (AC200V)						
Control voltage tolerance	times		0.85 to 1.1 (rated control voltage)						
Tripping time			See Fig. 2.2.1						
Tripping condition	Overload	%	[minimum tripping current] 110 to 120 (at setting current)						
	Phase failure	%	more than 70 (at setting current) [Tripping time : 2-4 sec.]						
	Reversal phase	%	more than 70 (at setting current) [Tripping time : less than 0.5 sec.]						
Withstand voltage	VAC		2500 [1 minute]						
Shock resistance	Vibration 10-55Hz	m/s ²	19.6						
	Sine wave pulse	m/s ²	49						
Conductor size	Main terminals	mm ²	2-14				3.5-22	5.5-60	14-200
	Control terminals	mm ²	1.25-2						

Note: ET-N relay cannot be used on DC circuit

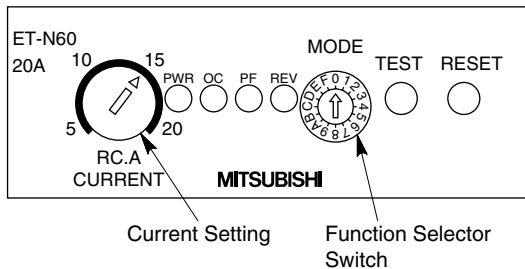
• Characteristic Curves



*Note: This electronic motor protection Relay does not contain thermal memory in accordance with IEC 60947-4-1.

• Selection of Protection Mode & Tripping Time

Table 2.2.2



The selector switch is set at position "7" (overload and phase failure protection mode; standard trip type) when shipping. So please reset the position of the changeover switch according to Table 2.2.2 before installation.

Protection mode	Overload tripping time at 600% of setting(s)	Symbol on changeover switch
Overload, phase failure and reversal phase [3E]	3	0
	5	1
	7	2
	15	3
	30	4
Overload and phase failure [2E]	3	5
	5	6
	7	7
	15	8
Overload only [1E]	30	9
	3	A
	5	B
	7	C
	15	D
	30	E

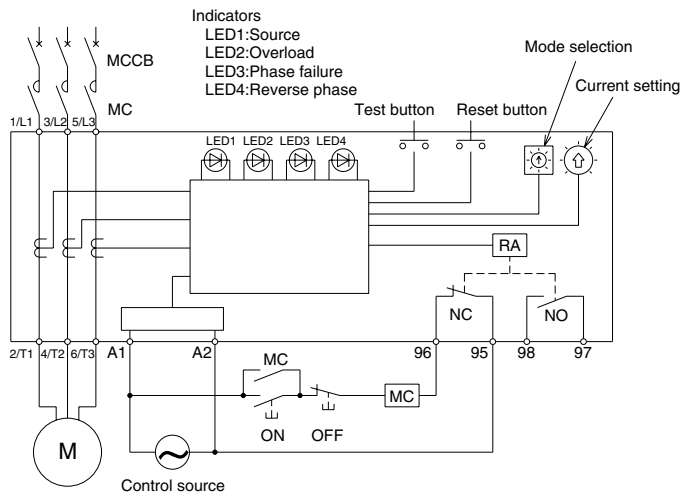
• Trip Class

mode	Trip class
0, 5, A	5
1, 6, B	—
2, 7, C	10
3, 8, D	20
4, 9, E	—

• Application to High Voltage or Big Motor Circuit

The high voltage current transformer (secondary current: smaller than 5A; capacity: more than 5VA) should be connected to ET-N60*8A in the star connection, when the load is high voltage or big AC motor.

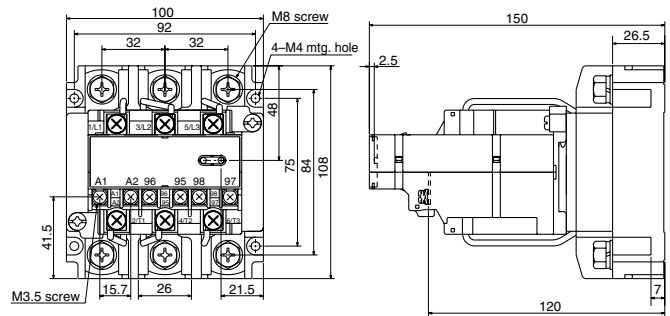
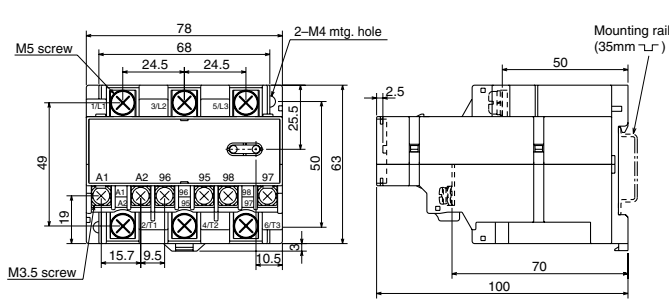
■ Wiring Precautions



- The control source should be wired in the same phases as the contactor control source.
- When the load is a single phase motor, use 1/ L1-2/T1 and 5/L3-6/T3 phases. And re-set the position of changeover switch to "A" to "E".

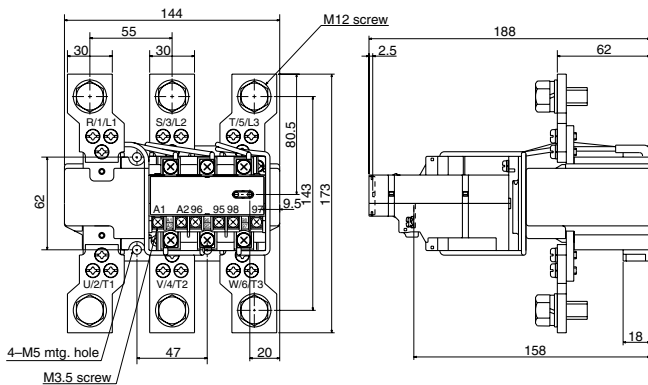
- If capacitors are used to correct the power factor, connect the capacitor in the power source side of the ET-N relay.

■ Outline Dimensions



ET-N60(1-60A) (Mass: 0.3kg)

ET-N150 (Mass: 1.6kg)



ET-N360 (Mass: 2.5kg)