

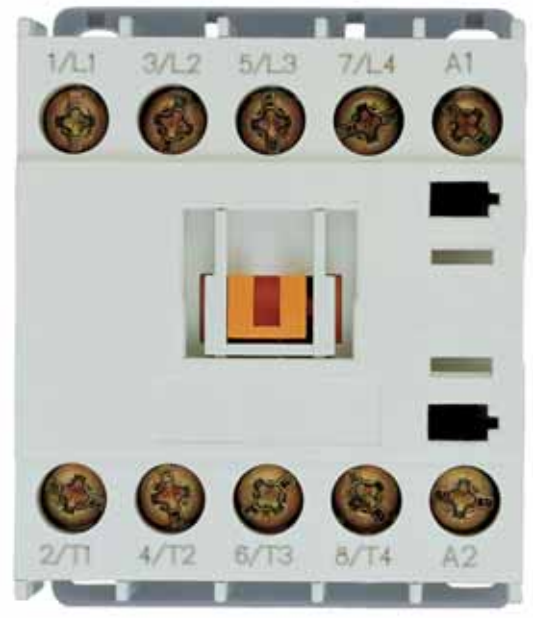


new **ELFIN**












UNI EN ISO 9002

# MINI CONTACTORS AND THERMAL O/L RELAY





Catalogue Series 090  
Edition 1<sup>a</sup> - English  
September 2004

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090





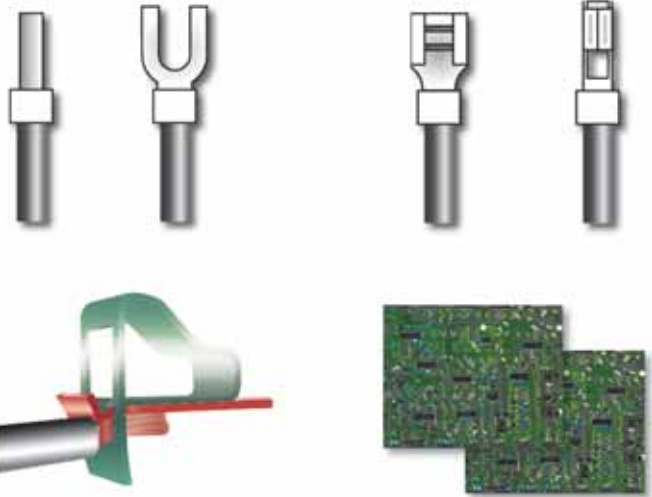
four

**STANDARD FOUR POLE**

New Elfin minicontactors are supplied as standard with four main pole. Customer can use the fourth pole like main or auxiliary contact.

**FOUR TYPE OF CONNECTIONS**

Minicontactors are available with various connections screw, solder pins, fast-on and cage damps (on request)



**VERSATILITY UTILIZATION**

Customer can change a standard minicontactor into a solder pins version with a special kit. The same operation is possible for the side mounting auxiliary contact. Customer can fit on solder pin minicontactor all the accessories of standard version (auxiliary contacts, timer mechanical interlock, RC unit thermal O/L relay).

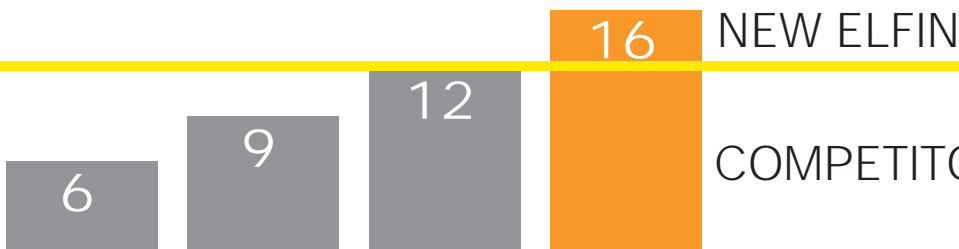
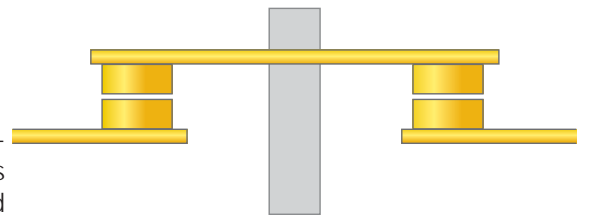


**COILS**

In our new range of minicontactors we can supply ac/dc coils as spare parts.

**INNOVATIVE TECNOLOGY**

The translation of main contacts is vertical. With this solutions minicontactors have a longer distance between fixed and moving contacts respect to a standard solution with horizontal translation. Making and breaking capacity and electrical life are longer than competitors.



**WIDE RANGE**

Our range of minicontactors arrive up to 16A 7.5Kw AC-3.

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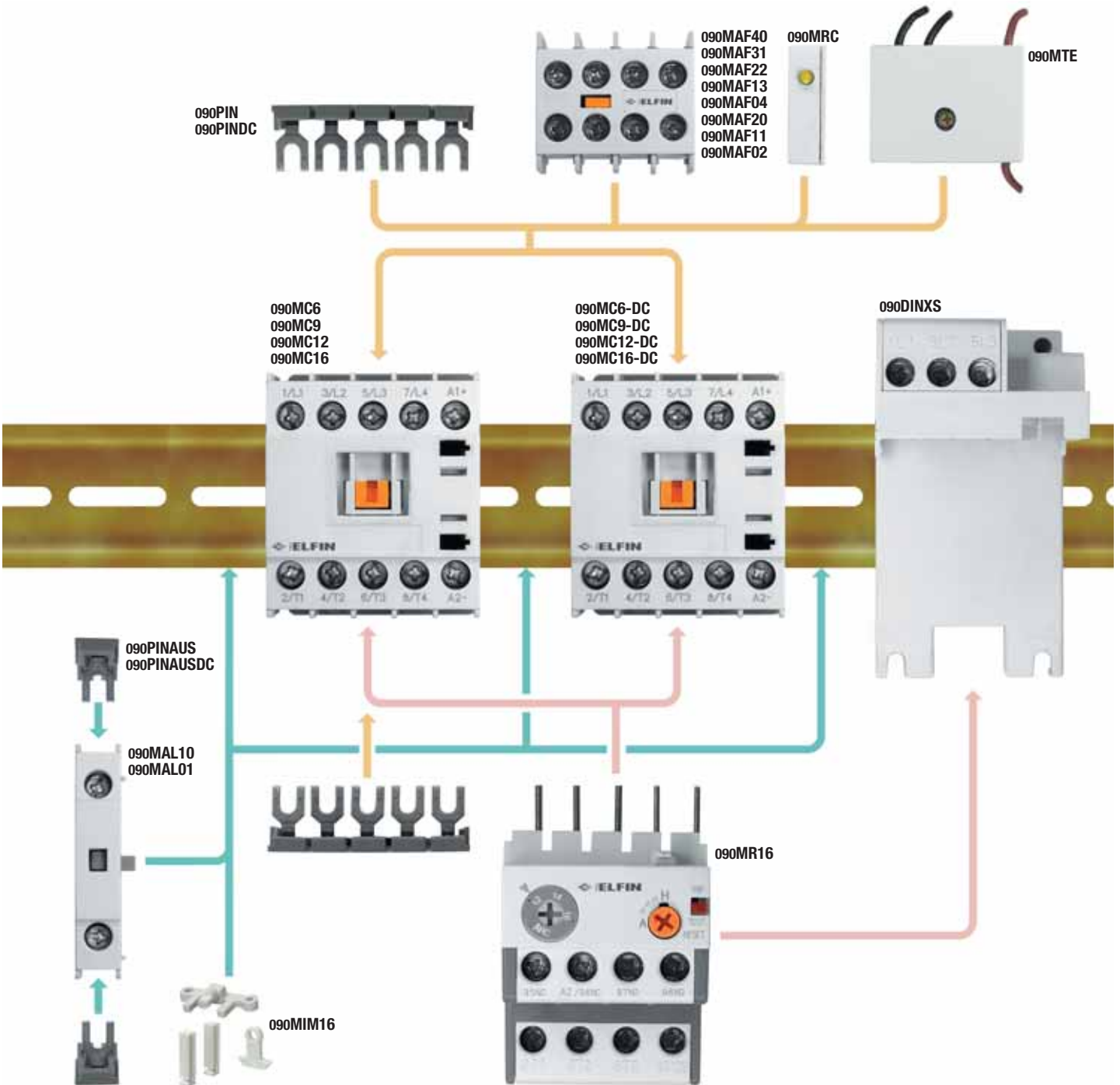




XSMALL SERIES LAY-OUT



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## INTRODUCTION



The standard describes the contactor as an electromechanical manoeuvring device, generally designed for a high number of operations, with just one idle position which is non-manually activated, capable of making carrying and breaking currents under normal circuit conditions, including overloading and operating conditions. The force required to close the main contacts which are normally open or to open contacts which are normally closed is supplied by an electromagnet. On the following pages you will find a series of useful information for choosing the best contactor for your specific requirements

### HOW TO DIMENSION A CONTACTOR

In order to correctly dimension a contactor, several factors have to be considered:

- the categories of use which identify the type of load
- the electrical life
- the number of operations per hour

### CONTACTORS UTILIZATION CATEGORIES

The standard establishes several categories of use referred to precise uses of contactors. These categories are listed in the following table.

ALTERNATING CURRENT		DIRECT CURRENT	
CATEGORIES	TYPICAL APPLICATIONS	CATEGORIES	TYPICAL APPLICATIONS
<b>AC-1</b>	Non inductive or slightly inductive loads, resistance furnaces	<b>DC-1</b>	Non inductive or slightly inductive loads, resistance furnaces
<b>AC-2</b>	Slip-ring motors: starting and switching off		
<b>AC-3</b>	Squirrel cage motors: starting switching off motors during running	<b>DC-3</b>	Shunt-motors: starting - plugging inching. Dynamic breaking of D.C. motors
<b>AC-4</b>	Squirrel cage motors: starting plugging - inching		
<b>AC-5a</b>	Switching of electric discharge lamp controls	<b>DC-5</b>	Series motors: starting - plugging - inching Dynamic braking of D.C. motors
<b>AC-5b</b>	Switching of incandescent lamps		
<b>AC-6a</b>	Switching of transformers		
<b>AC-6b</b>	Switching of capacitors banks		

### SWITCHING ELEMENTS UTILIZATION CATEGORIES

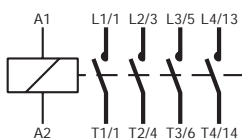
<b>AC-12</b>	Control of resistive loads and solid state loads with isolation by opto couples	<b>DC-12</b>	Control of resistive loads isolation by opto couples
<b>AC-13</b>	Control of solid state loads with transformer isolation	<b>DC-13</b>	Electromagnet control
<b>AC-14</b>	Control of small electromagnetic loads (< 72 VA)	<b>DC-14</b>	Control of electromagnetic loads having economic resistors in circuit
<b>AC-15</b>	Control of electromagnetic loads (> 72 VA)		







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### SECTION

6

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12

16

CONTROL VOLTAGE	0,17	0,17	0,17	0,17
24V - 50/60 Hz	<b>090MC6-24</b>	<b>090MC9-24</b>	<b>090MC12-24</b>	<b>090MC16-24</b>
48V - 50/60 Hz	<b>090MC6-48</b>	<b>090MC9-48</b>	<b>090MC12-48</b>	<b>090MC16-48</b>
110V - 50/60 Hz	<b>090MC6-110</b>	<b>090MC9-110</b>	<b>090MC12-110</b>	<b>090MC16-110</b>
230/240V - 50/60 Hz	<b>090MC6-240</b>	<b>090MC9-240</b>	<b>090MC12-240</b>	<b>090MC16-240</b>
380/400V - 50/60 Hz	<b>090MC6-400</b>	<b>090MC9-400</b>	<b>090MC12-400</b>	<b>090MC16-400</b>
	0,23	0,23	0,23	0,23
12V DC	<b>090MC6-12DCL</b>	<b>090MC9-12DCL</b>	<b>090MC12-12DCL</b>	<b>090MC16-12DCL</b>
24V DC	<b>090MC6-24DCL</b>	<b>090MC9-24DCL</b>	<b>090MC12-24DCL</b>	<b>090MC16-24DCL</b>
48V DC	<b>090MC6-48DCL</b>	<b>090MC9-48DCL</b>	<b>090MC12-48DCL</b>	<b>090MC16-48DCL</b>
110V DC	<b>090MC6-110DCL</b>	<b>090MC9-110DCL</b>	<b>090MC12-110DCL</b>	<b>090MC16-110DCL</b>

### SECTION

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#### PERFORMANCES IN ACCORDANCE WITH IEC-60947

AC1	20A	20A	20A	20A
AC3 200~240V	1.5 kW 7 A	2.2 kW 9 A	3 kW 12 A	4 kW 16 A
<b>380~440V</b>	<b>2.2 kW 6 A</b>	<b>4 kW 9 A</b>	<b>5.5 kW 12 A</b>	<b>7.5 kW 16 A</b>
500~550V	3 kW 5 A	3.7 kW 6 A	4 kW 7 A	5.5 kW 9 A
690V	3 kW 4 A	4 kW 5 A	4 kW 5 A	4 kW 5 A

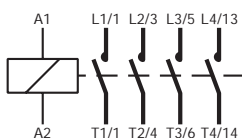
#### PERFORMANCES IN ACCORDANCE WITH UL/CSA<sup>(1)</sup>

lth	20A	25A	30A	32A
Monofase 115V	0.5 HP	0.5 HP	1 HP	2 HP
230V	1 HP	2 HP	3 HP	3 HP
Trifase 200V	2 HP	3 HP	5 HP	7 HP
230V	2 HP	3 HP	5 HP	7.5 HP
460V	5 HP	7.5 HP	10 HP	10 HP
575V	7.5 HP	10 HP	15 HP	15 HP

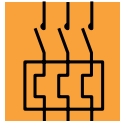
#### PERFORMANCES IN ACCORDANCE WITH IEC-60947

DC1 L/R<1ms	24V	1 pole in series	9 A	10 A	12 A	16 A
		2 poles in series	12 A	13 A	15 A	20 A
		3 poles in series	14 A	15 A	18 A	20 A
48V	1 pole in series	8 A	10 A	11 A	14 A	
	2 poles in series	10 A	12V	14 A	17 A	
	3 poles in series	14 A	15 A	16 A	20 A	
110V	1 pole in series	3 A	3 A	4 A	5 A	
	2 poles in series	6 A	7 A	8 A	9 A	
	3 poles in series	8 A	10 A	11 A	12 A	
DC3/DC5 L/R<10ms	24V	1 pole in series	6 A	7 A	9 A	12 A
		2 poles in series	7 A	9 A	12 A	15 A
		3 poles in series	9 A	10 A	14 A	18 A
48V	1 pole in series	5 A	6 A	8 A	10 A	
	2 poles in series	7 A	8 A	10 A	13 A	
	3 poles in series	9 A	10 A	12 A	15 A	
110V	1 pole in series	1 A	1 A	1 A	2 A	
	2 poles in series	3 A	4 A	5 A	6 A	
	3 poles in series	4 A	5 A	7 A	8 A	

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1) Maximum rated power



### SECTION

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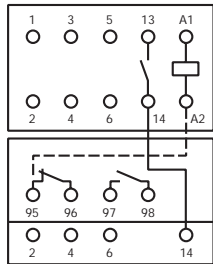
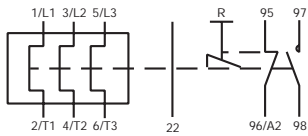
12

16



### RELAY

	SETTING RANGE (A) CODE		SETTING RANGE (A) CODE	
0,1	0.1 ... 0.16	<b>090MR16-016</b>	2.5 ... 4	<b>090MR16-4</b>
	0.16 ... 0.25	<b>090MR16-025</b>	4 ... 6	<b>090MR16-6</b>
	0.25 ... 0.4	<b>090MR16-04</b>	5 ... 8	<b>090MR16-8</b>
	0.4 ... 0.65	<b>090MR16-065</b>	6 ... 9	<b>090MR16-9</b>
	0.63 ... 1	<b>090MR16-1</b>	7 ... 10	<b>090MR16-10</b>
	1 ... 1.6	<b>090MR16-1V6</b>	9 ... 13	<b>090MR16-13</b>
	1.6 ... 2.5	<b>090MR16-2V5</b>	12 ... 16	<b>090MR16-16</b>



DIRECT MOUNTING OF T.O.R. TO MINICONTACTOR DIAGRAM OF PREWIRING



SEPARATE MOUNTING SYSTEM

6

9

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		CODE
0,3	Bar mounting adapter DIN 35	<b>090DINXS</b>

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AUXILIARY CONTACTS






SIDE MOUNTING

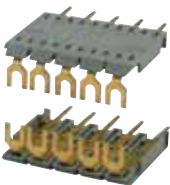


TOP MOUNTING



SECTION	6	9	12	16
 1NO	1NC			
0,02	<b>090MAL10</b>	<b>090MAL01</b>		
 4NO	3NO+1NC	2NO+2NC	1NO+3NC	4NC
0,04	<b>090MAF40</b>	<b>090MAF31</b>	<b>090MAF22</b>	<b>090MAF13</b>
 2NO	1NO+1NC	2NC		
0,03	<b>090MAF20</b>	<b>090MAF11</b>	<b>090MAF02</b>	

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FOR CONTACTORS




FOR AUXILIARY CONTACTS

SOLDER PIN TERMINAL

		CODE
 0,02	Short terminal A.C. Long terminal D.C.	<b>090PIN</b> <b>090PINDC</b>
 0,01	Short terminal A.C. Long terminal D.C.	<b>090PINAUS</b> <b>090PINAUSDC</b>



SURGE SUPPRESSOR UNIT

SECTION	6	9	12	16
	CODE			
0,005 24-48V CA	<b>090MRC48</b>			
0,005 60-127V CA	<b>090MRC110</b>			
0,005 200-240V CA	<b>090MRC240</b>			
0,005 17-24V CC	<b>090MRC24DC</b>			
0,005 36-72V CC	<b>090MRC72DC</b>			



MECHANICAL INTERLOCK

SECTION	6	9	12	16
	CODE			
0,005	<b>090MIM16</b>			







ELECTRONIC TIMER UNIT

SECTION

6

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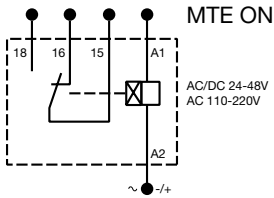
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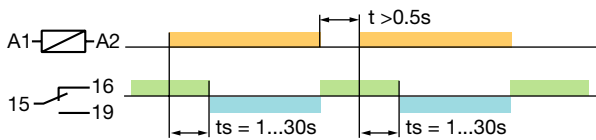
CODE

- 0,04 24-48V CA/CC delay ON 1-30 s
- 0,04 100-220V CA/CC delay ON 1-30 s
- 0,04 24-48V CA/CC delay OFF 1-30 s
- 0,04 100-220V CA/CC delay OFF 1-30 s

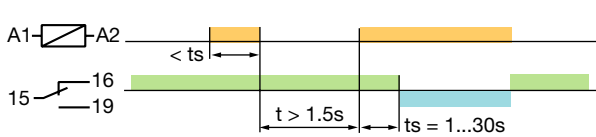
- 090MTEON48
- 090MTEON220
- 090MTEOFF48
- 090MTEOFF220



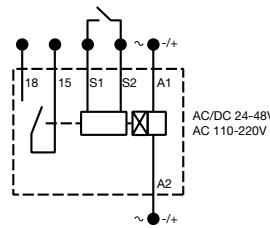
POWER INTERRUPTION AFTER TIMEOUT FINISHED



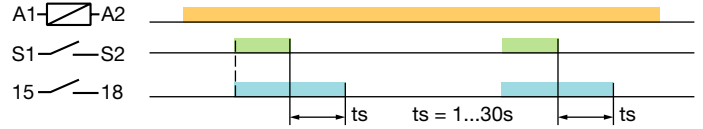
POWER INTERRUPTION BEFORE TIMEOUT FINISHED



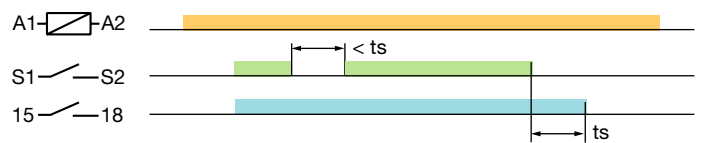
De-energized  
Energized



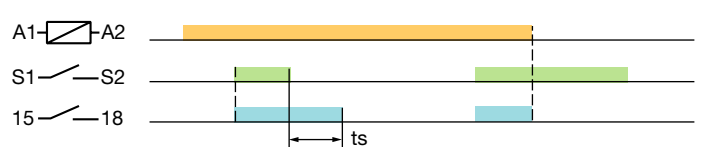
POWER INTERRUPTION AFTER TIMEOUT FINISHED



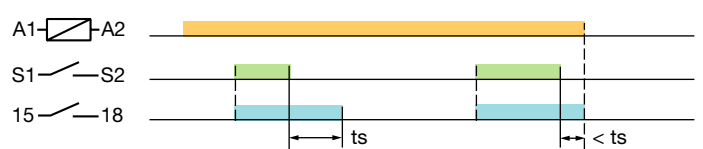
TURN ON SWITCH (S1-S2) BEFORE TIME OUT FINISHED



POWER INTERRUPTION WHEN OPERATING TIMER



POWER INTERRUPTION ON DELAYING



COIL



CONTROL VOLTAGE

- 24V 50-60Hz
- 48V 50-60Hz
- 0,07 110V 50-60Hz
- 230V/240V 50-60Hz
- 380V/400V 50-60Hz
- 12V CC low consumption
- 24V CC low consumption
- 0,08 48V CC low consumption
- 110V CC low consumption

CODE

- 090B16-24
- 090B16-48
- 090B16-110
- 090B16-220
- 090B16-380
- 090B16-12DCL
- 090B16-24DCL
- 090B16-48DCL
- 090B16-110DCL

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SPARE PARTS





### ACCORDANCE WITH STANDARDS APPROVAL<sup>(1)</sup>

### TEMPERATURE LIMITS

### USAGES ALTITUDES

### PROTECTION DEGREE

### MECHANICAL DURABILITY [mil cycles]

### ELECTRICAL LIFE [mil cycles]

### NUMBER OF OPERATION PER HOUR

### IN AC-3 [n° cycles]

EN 60947-4-1, UL508, VDE 0660, BS 5424  
 UL, cUL  
 Storage  $\geq -30^{\circ}\text{C} \div \leq +65^{\circ}\text{C}$  - operation  $\geq -25^{\circ}\text{C} \div \leq +40^{\circ}\text{C}$   
 2.000 m  
 IP 20  
 12  
 1  
 1800



### NUMBER OF POLES

### RATED INSULATION

### VOLTAGE $U_i$ MINICONTACTORS

### MAXIMUM MAKING CAPACITY

### MAXIMUM BREAKING CAPACITY

### COIL OPERATING

### LIMITS

4  
 690V  
 10 X  $I_e$  in cat. AC-3      **6**      **9**      **12**      **16**  
 72A    108A    144A    180A  
 8 X  $I_e$  in cat. AC-3      60A    90A    120A    150A  
 -15% - +10%  $U_c$  (rated control voltage)

### RATED INSULATION

### VOLTAGE $U_i$ RELAY

### RELAY TRIPPING CLASS IN

### ACCORDANCE WITH IEC-947-4-1

### RELAY AUXILIARY CONTACT

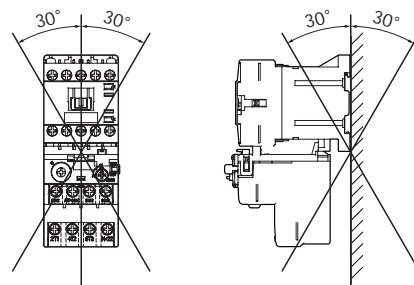
### RELAY RESET TYPE

### DISSIPATED PWR RELAY PHASE

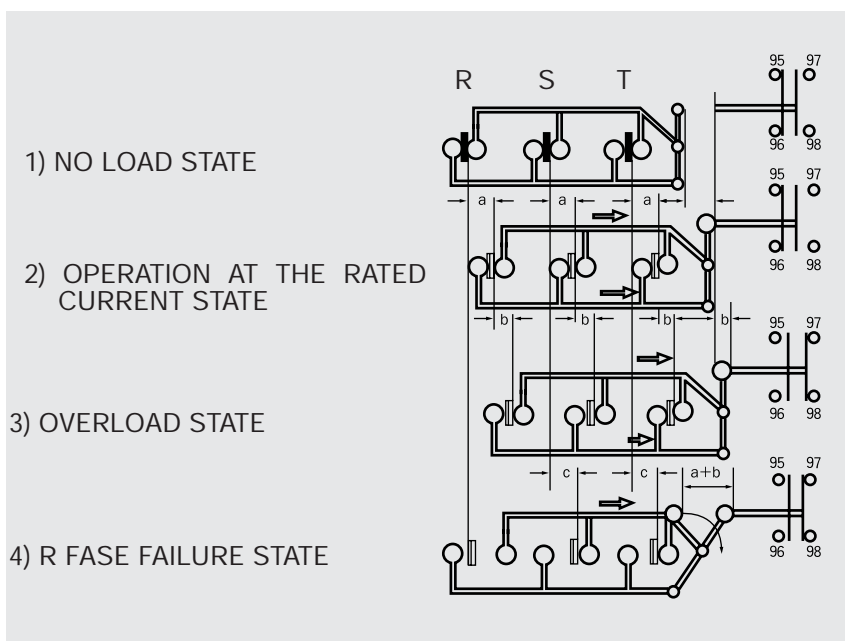
### TEMPERATURE LIMITS

690V  
 10A (tripping time from 2 to 10s)  
 1NO + 1NC  
 manual or automatic selectable  
 1,8VA  
 Storage  $\geq -30^{\circ}\text{C} \leq +65^{\circ}\text{C}$   
 Operation  $\geq -25^{\circ}\text{C} \leq +65^{\circ}\text{C}$  compensated

### MOUNTING POSITION



## EXCLUSIVE AMPLIFIED DIFFERENTIAL LEVER TRIPPING MECHANISM



1) 16A mo UL cUL



## AUXILIARY CHARACTERISTICS



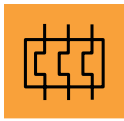
60Hz (50Hz)	Coil consumption [VA]			Dissipation [W]	Coil operating limit [V]		Operating time (ms)	
	Pick-up	Sealed			Pick-up	Drop-out	Pick-up	Drop-out
6	32	6	2	80 - 110%	30 - 40%	10 - 20	35 - 45	
9	32	6	2	80 - 110%	30 - 40%	10 - 20	35 - 45	
12	32	6	2	80 - 110%	30 - 40%	10 - 20	35 - 45	
16	32	6	2	80 - 110%	30 - 40%	10 - 20	35 - 45	



60Hz (50Hz)	Coil consumption [VA]			Dissipation [W]	Coil operating limit [V]		Operating time (ms)	
	Pick-up	Sealed			Pick-up	Drop-out	Pick-up	Drop-out
6	1.2	1.2	1.2	80 - 125%	10 - 30%	40 - 50	35 ÷ 45	
9	1.2	1.2	1.2	80 - 125%	10 - 30%	40 - 50	35 ÷ 45	
12	1.2	1.2	1.2	80 - 125%	10 - 30%	40 - 50	35 ÷ 45	
16	1.2	1.2	1.2	80 - 125%	10 - 30%	40 - 50	35 ÷ 45	

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### AUXILIARY CONTACT RELAYS ELECTRICAL CHARACTERISTICS

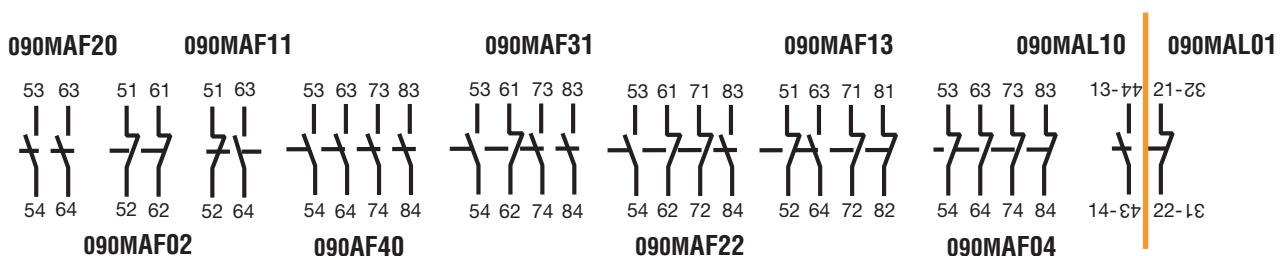


090R16	Ith	AC11/AC-15			DC11 / DC13	
		110V	220V	550V	110V	220V
	[A]	[A]	[A]	[A]	[A]	
	16	0.3/2.5	0.3/2	0.3/1	0.28	0.14

### AUXILIARY CONTACT ELECTRICAL CHARACTERISTICS

090MAF...	Ith	RATED CURRENT								Number operation/h	Mechanical life	ELECTRICAL LIFE [op x 10.000]
		AC-15				DC-13						
		120V	240V	480V	600V	125V	250V	440V	600V			
	[A]	[A]	[A]	[A]	[A]	[A]	[A]	[A]	[A]			
090MAF...	16	6	3	1.5	1.2	1.1	0.55	0.31	0.2	1800	1200	100
090MAL...	16	6	3	1.5	1.2	1.1	0.55	0.31	0.2	1800	1200	100

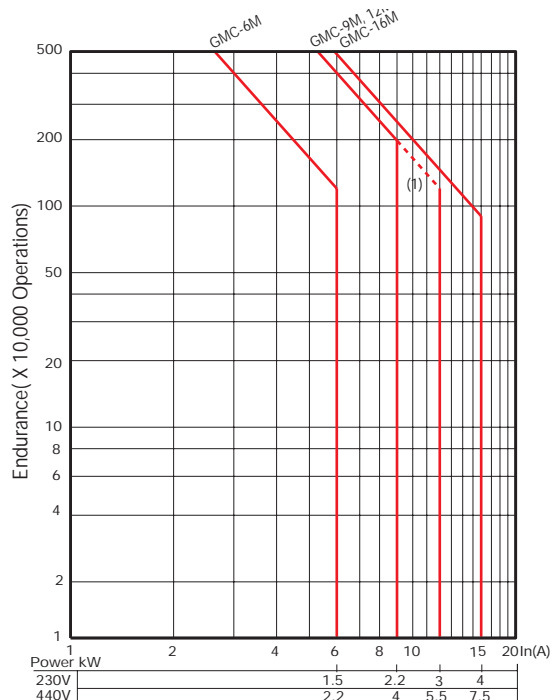
### TERMINALS MARKING OF AUXILIARY CONTACTS



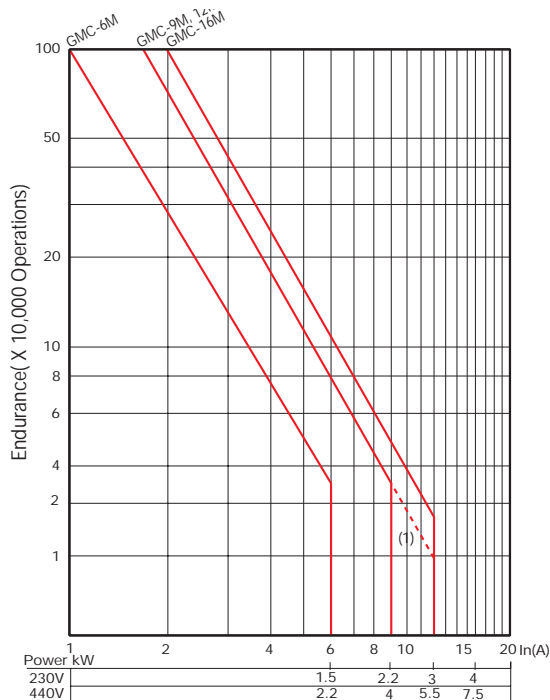


## ELECTRICAL LIFE TIME

### AC-3 UE 380-440V

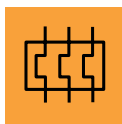


### AC-4 UE 380-440V

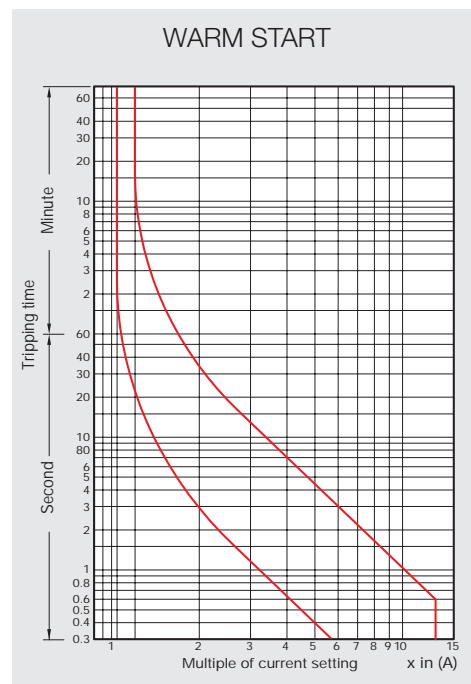
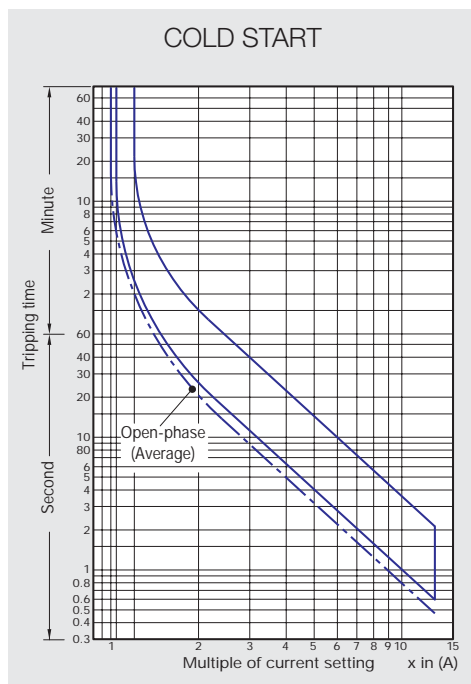


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## RELAY CURVE CHARACTERISTICS



090MR16

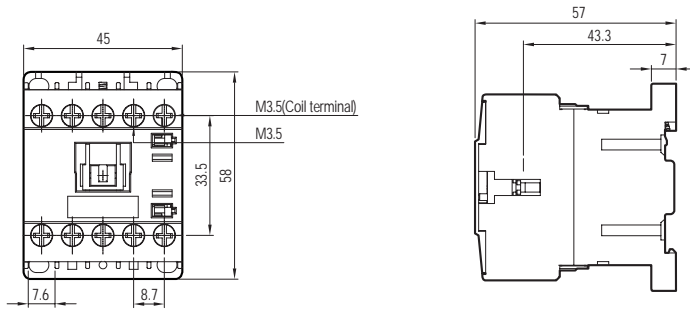




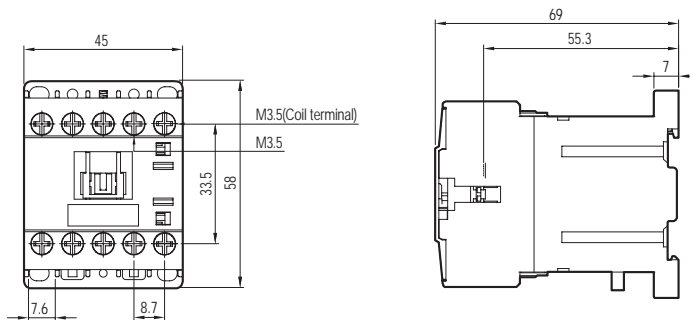
9 12 18 22

SECTION

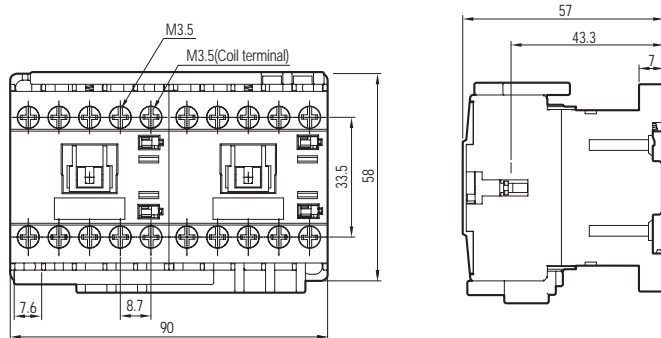
A.C. MINICONTACTORS



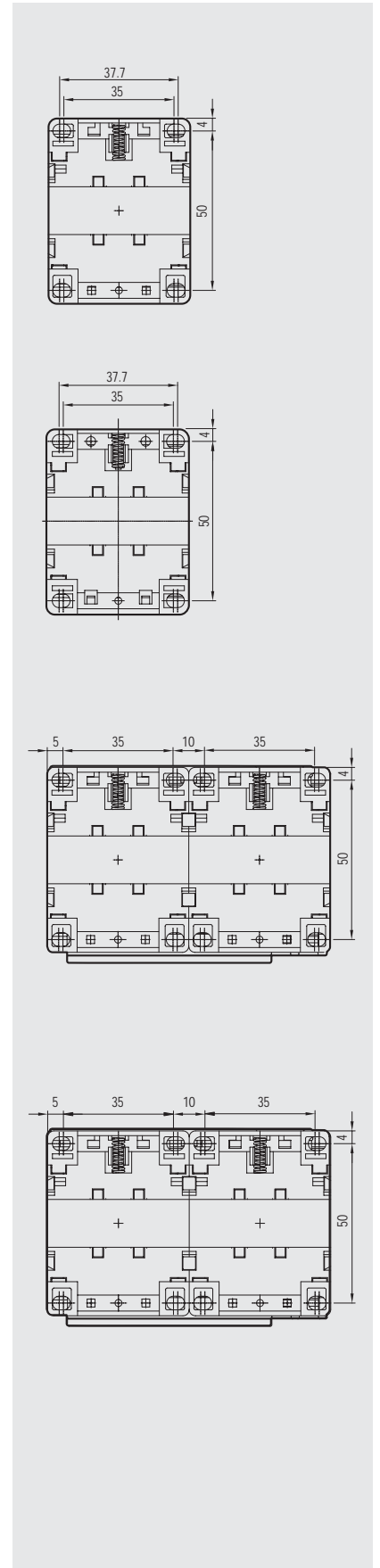
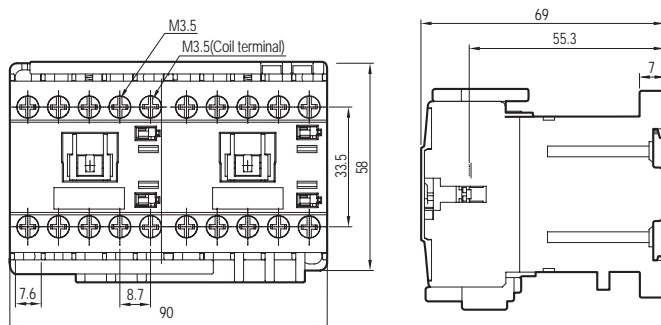
D.C. MINICONTACTORS



A.C. MINICONTACTORS INTERLOCKED



D.C. MINICONTACTORS INTERLOCKED



090



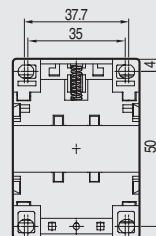
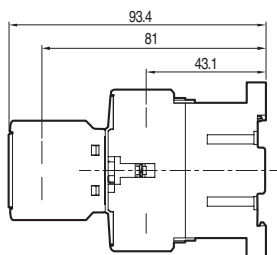
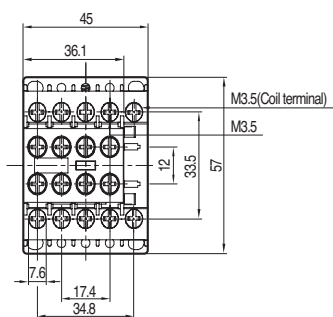


## OVERALL DIMENSIONS

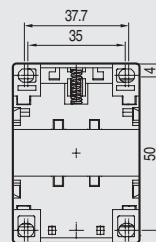
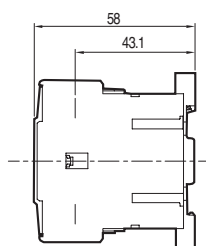
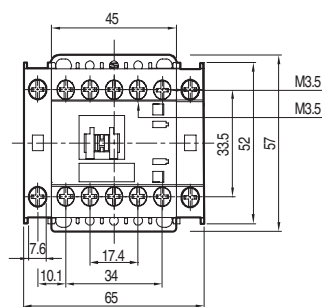
**9****12****18****22**

### SECTION

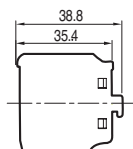
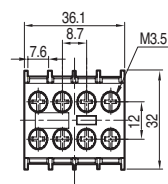
MINICONTACTOR WITH  
TOP MOUNTING AUX.  
CONTACT



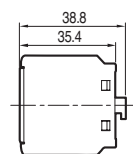
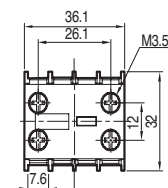
MINICONTACTOR WITH  
SIDE MOUNTING AUX.  
CONTACT



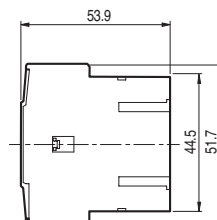
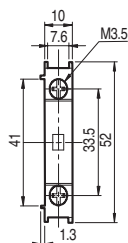
TOP MOUNTING AUX.  
CONTACT (4 POLE)



TOP MOUNTING AUX.  
CONTACT (2 POLE)



SIDE MOUNTING AUX.  
CONTACT



090





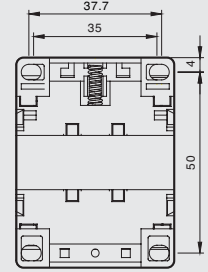
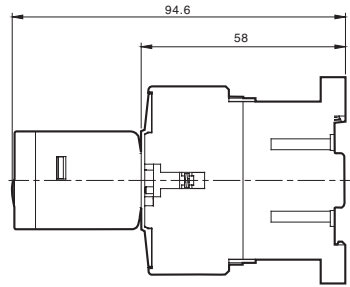
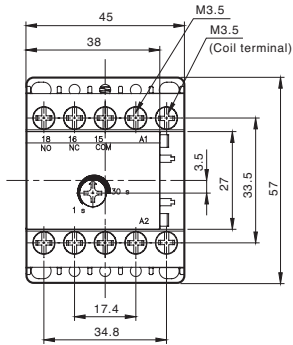


OVERALL DIMENSIONS

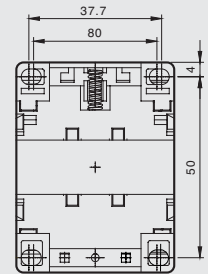
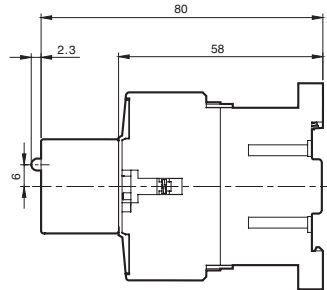
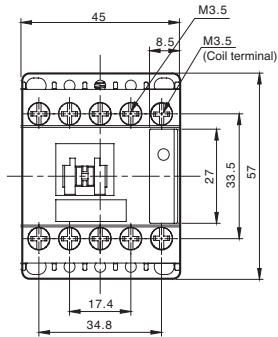
9 12 18 22

SECTION

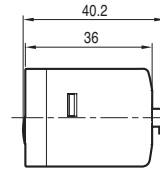
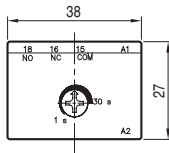
MINICONTACTOR WITH ELECTRONIC TIMER



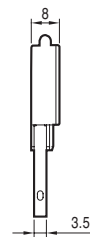
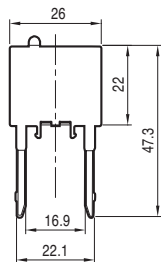
MINICONTACTOR WITH SURGE SUPPRESSOR UNIT



ELECTRONIC TIMER



SURGE SUPPRESSOR UNIT



090



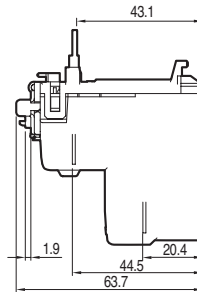
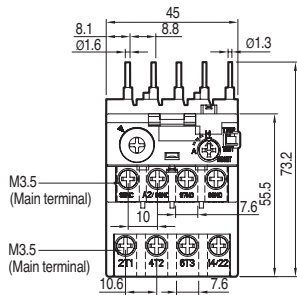


OVERALL DIMENSIONS

9 12 18 22

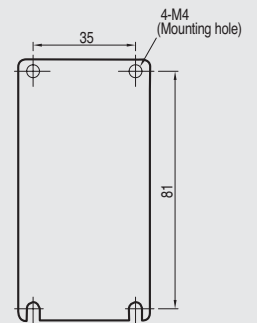
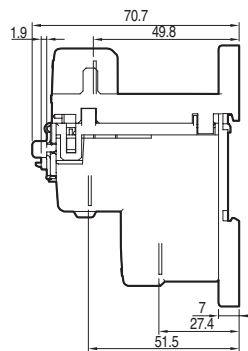
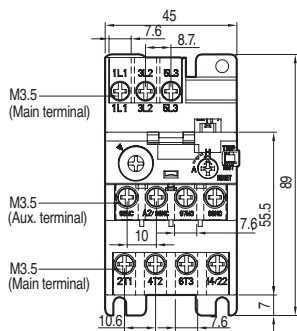
SECTION

T.O.R.

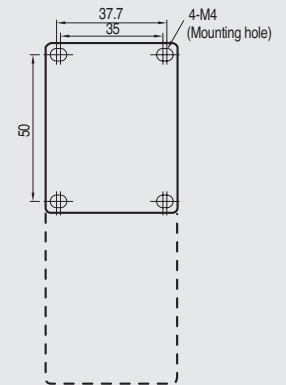
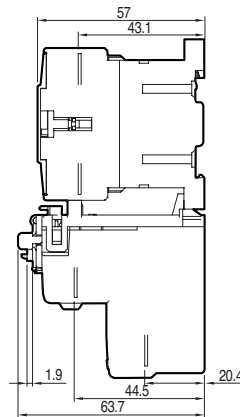
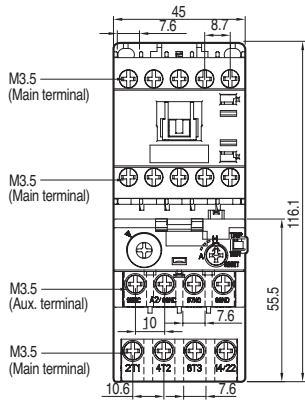


T.O.R. WITH SEPARATE MOUNTING ADAPTOR

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T.O.R. DIRECT MOUNTING ON A.C. MINICONTACTOR



T.O.R. DIRECT MOUNTING ON D.C. MINICONTACTOR

