



# Metasol

**Magnetic Switches  
(Magnetic Contactors &  
Thermal Overload Relays)**

### 1] Performance

#### 1] Performance

#### 2] Structure

#### 3] Numbering system

#### 4] Range & Frame

#### 5] Specification

#### 6] Features

#### 7] Accessories

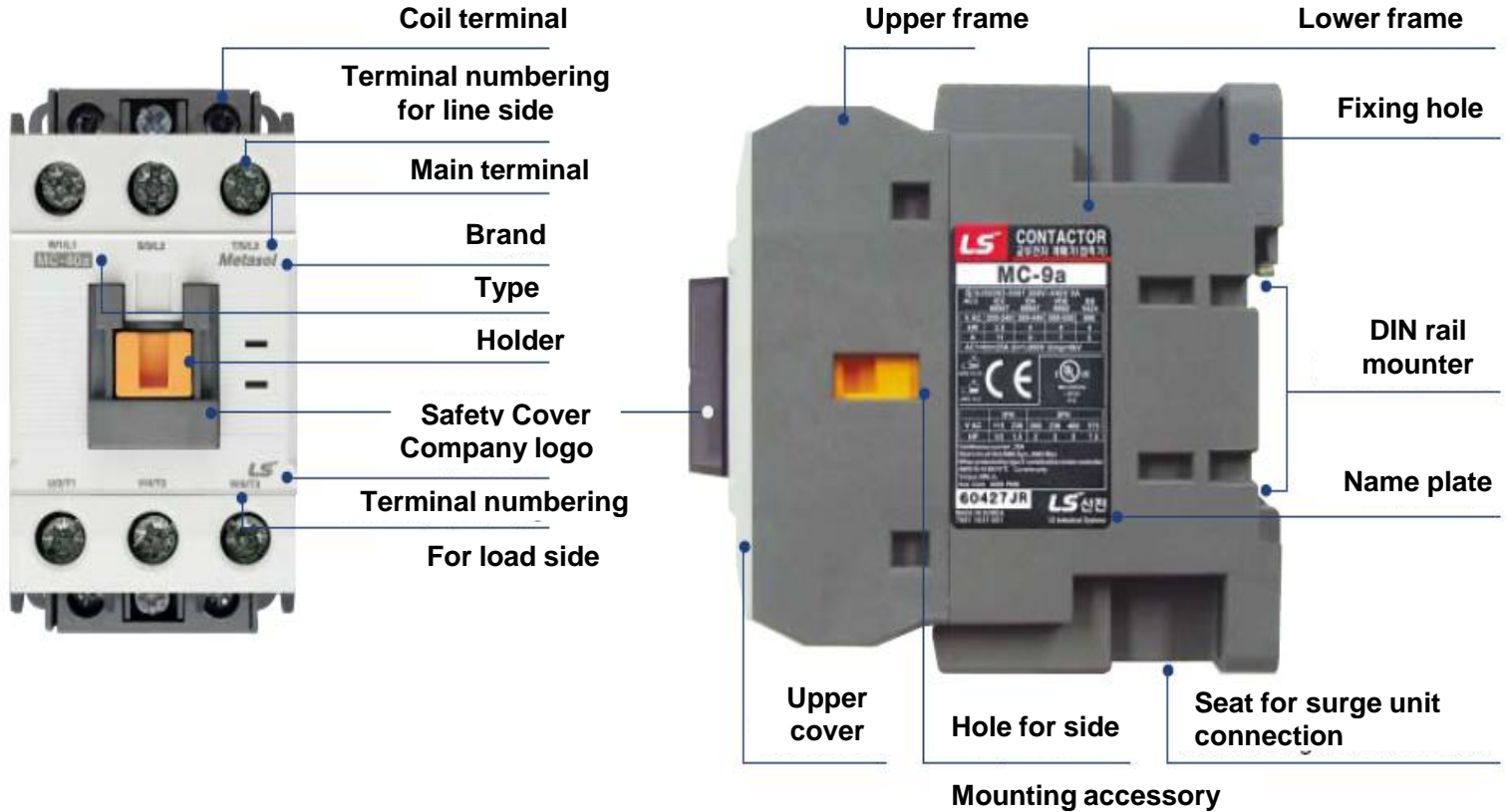
#### 8] Certificates

- Compact size & Easy connection
- Improved Arc Protection from sealed structure
- Upgrade Rated Insulation voltage (690V->1000V over 40AF)
- Upgrade Impulse withstand voltage (6kV->8kV over 40AF)
- Upgrade Low current reliability at Low voltage (DC24V 10mA-> DC17V 5mA)
- Direct MMS Mounting (~40AF & will be expanded up to 100AF)
- Satisfied with Type 2 coordination



### 2] Structure

#### ➤ Magnetic Contactors



1] Performance

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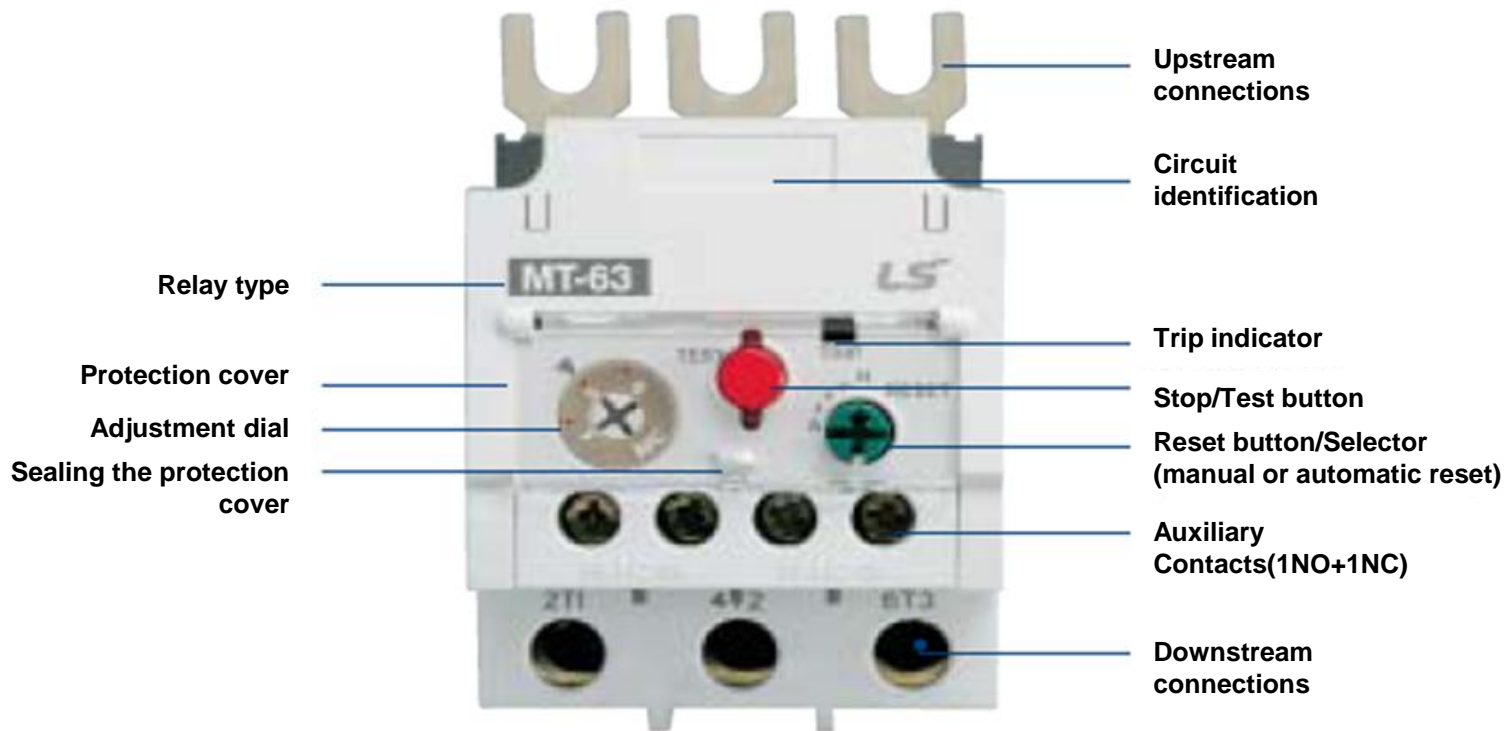
6] Features

7] Accessories

8] Certificates

### 2] Structure

#### Thermal Overload Relays



1] Performance

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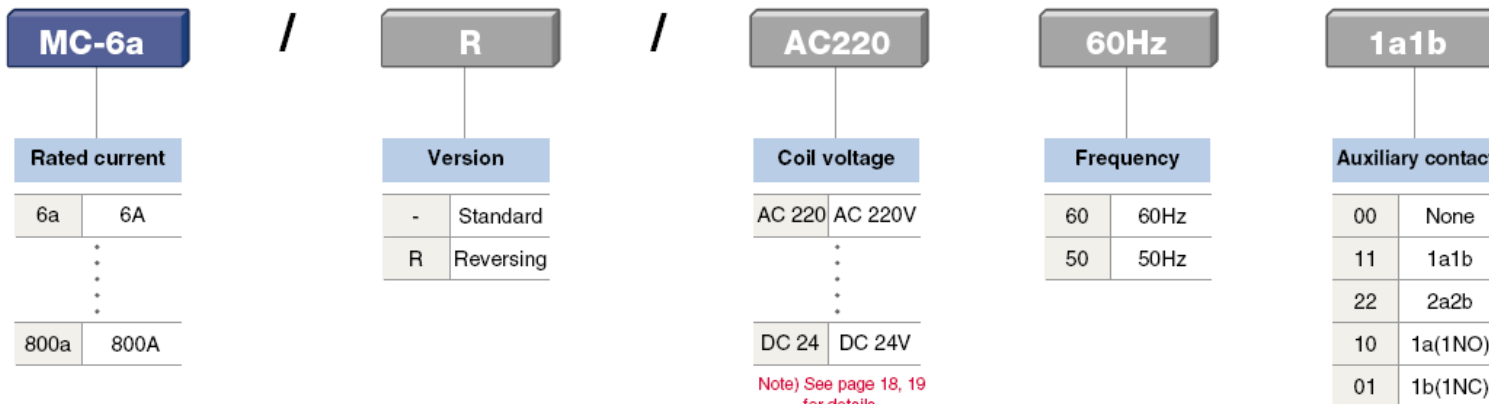
7] Accessories

8] Certificates

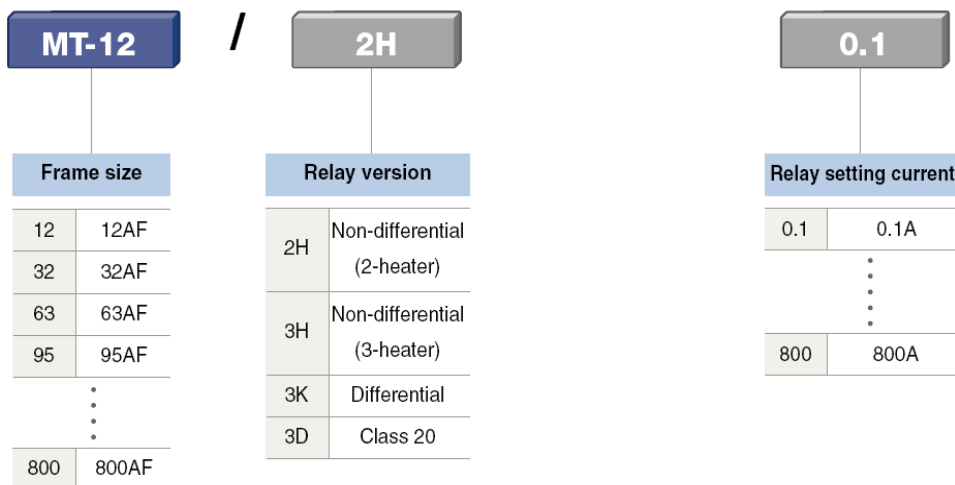
# 3] Numbering System

## Catalog Numbering System

### Contactors



### Thermal Overload Relay



1] Performance

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### 3] Numbering System

#### Catalog Numbering System

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#### Auxiliary contact unit

**UA1**

Version	
UA-1	Side mount
AU-100	
AU-2	Front mount(2P)
AU-4	Front mount(4P)

**11**

Contact composition	
11	1NO+1NC
20	2NO
02	2NC
40	4NO
31	3NO+1NC
22	2NO+2NC
13	1NO+3NC
04	4NC

#### Surge absorber

**US11**

Composition and voltage		
1	Varistor+RC	AC/DC 24~48V
2	Varistor+RC	AC/DC 100~125V
3	Varistor+RC	AC/DC 200~240V
4	Varistor+RC	AC 380~440V
5	Varistor+RC	AC 24~48V
6	Varistor+RC	AC 100~125V
11	Varistor	AC 200~240V
12	Varistor	DC 24~48V
13	Varistor	DC 100~125V
14	Varistor	DC 200~220V
22	RC	AC 100~125V

#### Interlock unit

**UR02**

Contact composition	
02	2NC
00	None

#### Wire kit for Interlocking

**UW32**

Frame size	
18	18AF
22	22AF
32	32AF
63	63AF
95	95AF

#### Interlock set (UR+UW)

**RK32**

Frame size	
32	32AF
63	63AF
95	95AF

#### Separate mounting unit (For relay)

**UZ32**

Frame size	
32	32AF
63	63AF
95	95AF
150	150AF

#### Remote reset unit (For relay)

**UM**

Cable length	
4R	400
5R	500
6R	600

### 4] Range & Frame

1] Performance

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4] Range & Frame

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	18AF	22AF	40AF	65AF	100AF
Contactor	MC-6a, 9a, 12a, 18a	MC-9b, 12b, 18b, 22b	MC-32a, 40a	MC-50a, 65a	MC-75a, 85a, 100a
Rated current	6, 9, 12, 18A	9, 12, 18, 22A	32, 40A	50, 65A	75, 85A
Rated insulation voltage	690V				
Type II	150kA@ 415V Max.				
Overload relay	MT-12	MT-32	MT-32	MT-63	7~100A
Current range	0.1~18A	0.1~40A	0.1~40A	4~65A	
Trip class	Class 10,20				
Outline view					

### 4] Range & Frame

	150AF	225AF	400AF	800AF
Contactor	MC-130a, 150a	MC-185a, 225a	MC-265a, 330a, 400a	MC-500A, 630a, 800a
Rated current	120, 150A	185, 225A	265, 330, 400A	500, 630, 800A
Rated insulation voltage	690V			
Type II	150kA@ 415V Max.			
Overload relay	MT-150	MT-225	MT-400	MT-800
Current range	34~150A	65~240A	85~400A	200~800A
Trip class	Class 10,20			
Outline view				

1] Performance

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### 4] Range & Frame

#### Magnetic Contactors

1] Performance

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Metasol Series			
AF	Type	Size(W x H x D)	TOR,MMS
18AF	MC-6a	a : 45×74.5×80.6	MT-12 MMS-32
	MC-9a		
	MC-12a		
	MC-18a		
22AF	MC-9b, 12b, 18b, 22b	b : 45×74.5×86	MT-32 MMS-32
40AF	MC-32a	45×83×93	
	MC-40a		
65AF	MC-50a	55×106×122	MT-63
	MC-65a		
100AF	MC-75a	70×140×137	MT-95
	MC-85a		
	MC-100a		

### 4] Range & Frame

#### Thermal Overload Relays

MT-12      MT-32      MT-63      MT-95



MT-150      MT-225      MT-400      MT-800



Overload relay		Contactor
Type	Setting range	Type
MT - 12	0.1~18A	MC-6a
		MC-9a
		MC-12a
		MC-18a
MT - 32	0.1~40A	MC-9b
		MC-12b
		MC-18b
		MC-22b
MT - 63	4~65A	MC-32b
		MC-40b
MT - 95	7~100A	MC-50a
		MC-65a
MT - 150	34~150A	MC-75a
		MC-85a
		MC-100a
MT - 225	65~240A	MC-130a
		MC-150a
MT - 400	85~400A	MC-185a
		MC-225a
		MC-265a
MT - 800	200~800A	MC-330a
		MC-400a
		MC-500a
		MC-630a
		MC-800a

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### 5] Specification

#### Low Ampere Frame

Ampere Frame	18F	22F	40F	35F	100F
Model	MC-6a	MC-6b	MC-32a	MC-50a	MC-75a
	MC-9a	MC-9b	MC-40a	MC-65a	MC-85a
	MC-12a	MC-12b			MC-100a
	MC-18a	MC-18b			
Auxiliary (standard)	1a or 1b	1a 1b	2a 2b		
Rated insulation voltage, $U_i$	690v	690v	1000v		
Rated operational Voltage, $U_e$	690v				
Number of poles	3 Pole (4 pole will be launched in 2009)				
Terminal Type	Screw				
Electric Durability	2.5 mil. operations			2 mil. operations	
Rated impulse withstand voltage, $U_{imp}$	6kV		8kV		

- 1] Performance
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### 5] Specification

#### High Ampere Frame

1] Performance

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





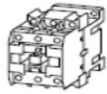








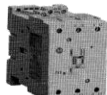
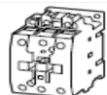

8] Certificates

Frame			150AF		400AF	800AF
			MC-130	MC-150	MC-265	MC-500
Wire connection			Screw	Screw	Screw	Screw
Number of poles			3 Pole(4 pole will be launched in 2010)			
Rated operational voltage (Ue)			Up to 1000V	Up to 1000V	Up to 1000V	Up to 1000V
Rated frequency			50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz
Rated insulation voltage (Ui)			1000V	1000V	1000V	1000V
Rated impulse voltage (Uimp)			8kV	8kV	8kV	8kV
Degree of protection (IEC 60 529)			IP 20	IP 20	IP 40	IP 40
Mechanical endurance (Cycles)			5,000,000	5,000,000	5,000,000	5,000,000
Electrical endurance for Ie/AC3 (Cycles)			1,000,000	1,000,000	1,000,000	500,000
Max operating frequency per hour (Ope./h)			1200	1200	1200	1200
Wire size (Solid, stranded)		AWG	3-4/0	3-4/0	350-700	1700-Busbar
Conventional free air thermal current (Ith,AC1)			160	210	300	580
Rated operational power / current / Ie (AC3)	220/240V	kW	37	45	75	147
		A	130	150	265	500
	380/440V	kW	60	75	132	250
		A	130	150	265	500
	500/550V	kW	60	90	140	295
		A	90	140	265	500
Rated operational power / current / Ie (AC4)	220/240V	kW	22	30	-	-
		A	93	125	-	-
	380/440V	kW	45	55	102	176
		A	90	110	164	300

### 6] Features

#### Auxiliary contacts

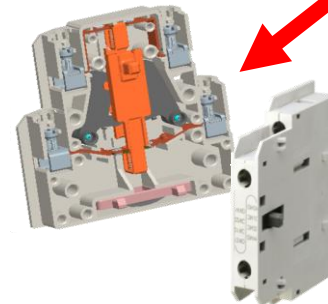
- 1] Performance
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AF	Tele	Siemens	ABB	GE	AB	KM	Fuji (SC-E)	Cutler Hammer	LS (Metasol)
12 AF	 1a1b			 1a or 1b	 1a or 1b	 Option		 Option	18AF 1a or 1b
32 AF	 1a1b	Option	Option	 Option	 Option	 Option	Option	 Option	22AF (1a1b)
50 AF	 1a1b	Option	Option	 Option	 Option	 Option	Option	 Option	Option
95 AF	 1a1b	Option	Option	 Option	 Option	 Option	None	 Option	Option

### 6] Features

#### Easy assembly

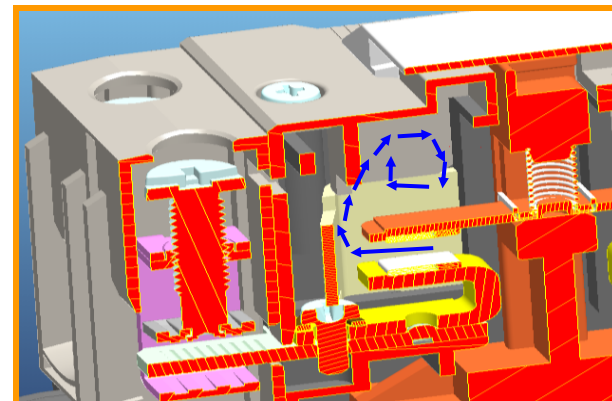
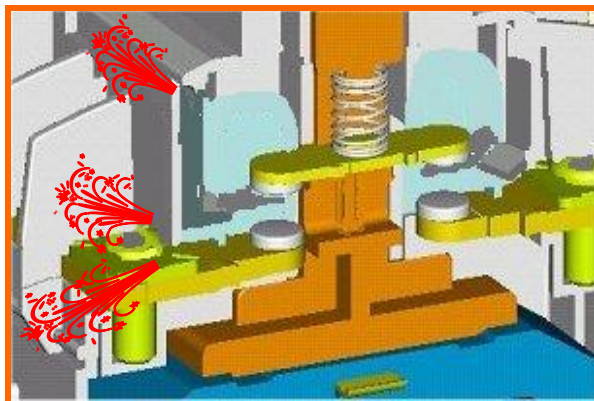
- Easy way to make a reversing contactor combination
- No need an additional auxiliary contact for electrical interlock



### 6] Features

#### ➤ Safety

- No arc exposure from the sealed structure

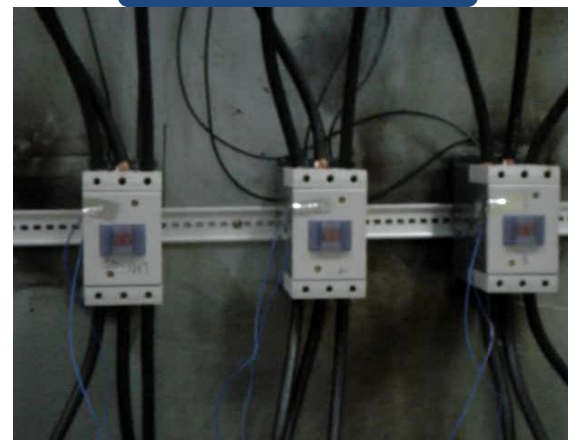


#### ➤ Continued Safety

Meta-MEC series



Metasol series





### 6] Features

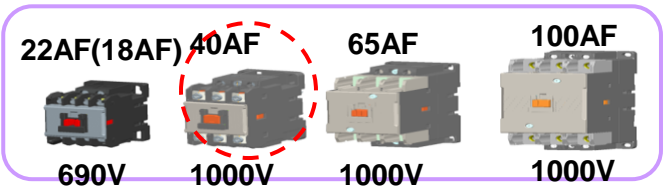
#### ☑ Safety Reliability

- 1] Performance
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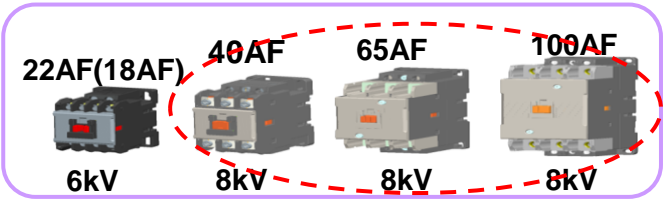
#### Meta-MEC

#### Metasol

Rated insulation voltage,  $U_i$



Rated impulse withstand voltage,  $U_{imp}$



Comparison

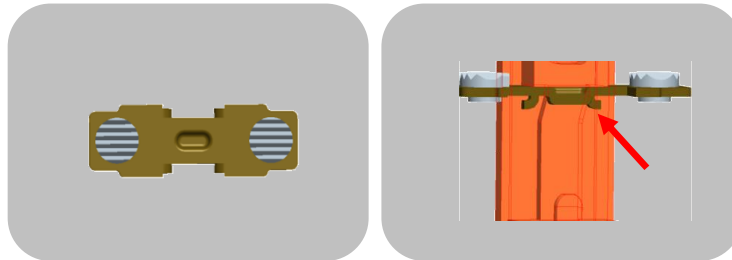
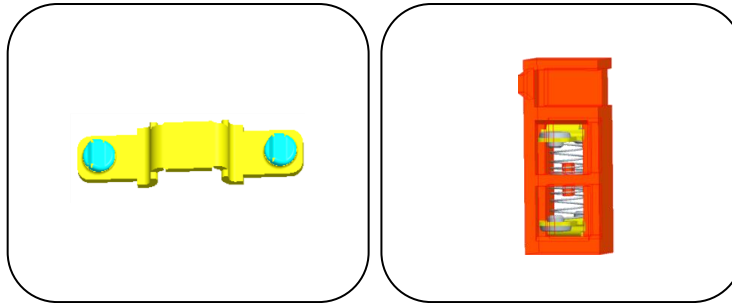
Type	Range	Schneider	Siemens	Moeller	AB	C/H	LS Metasol
$U_i$ (1000V)	32A	X	X	X	X	X	1000V
	50A	1000V	X	X	X	X	1000V
	85A	1000V	1000V	1000V	X	X	1000V
$U_{imp}$ 내전압	32A	6KV	6kV	6kV	6kV	6kV	8KV
	50A	8KV	6kV	6kV	6kV	6kV	8KV
	85A	8KV	6kV	6kV	6kV	6kV	8KV



### 6] Features

#### Conduct reliability

- To ensure that the auxiliary contact remain conductive



Suitable  
for

Electronic circuits  
(Programmable  
Controllers)  
with voltage  
more than **17V**  
And current **5mA**

1] Performance

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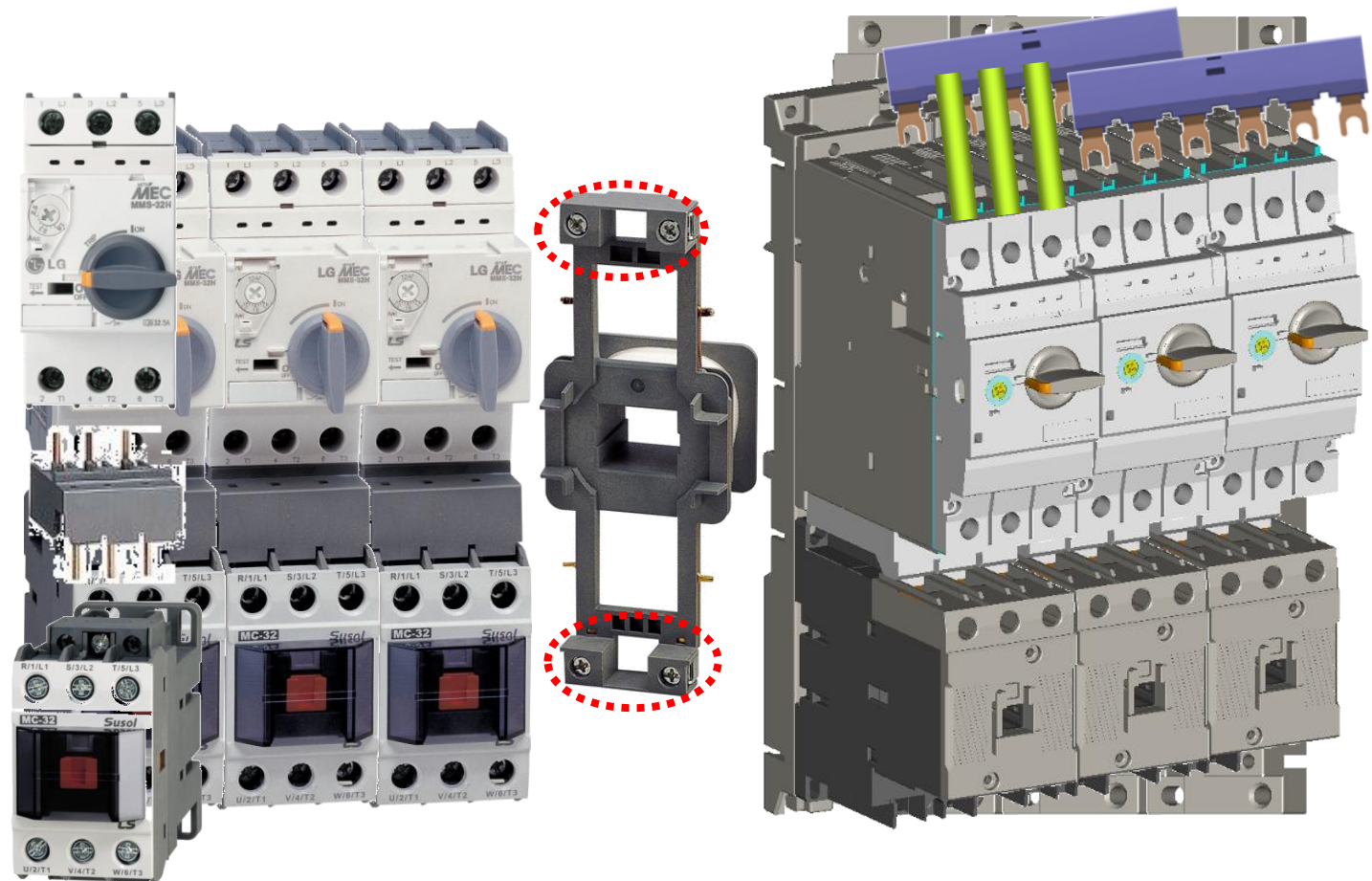
7] Accessories

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### 6] Features

#### Compact solution

To make a compact panel in a flash



### 6] Features

#### ■ Type 2 Coordination

➤ To make a compact panel in a flash

- **Type 1 coordination**
  - Protection for personnel
- **Type 2 coordination**
  - Protection for personnel and equipment
- **Reduce maintenance costs**
  - repair time
  - equipment replacement costs



- 1] Performance
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## 6] Features

### ☑ Type 2 Coordination

### ☑ Application example in Building Sector

- Air conditioning

Type 1 coordination

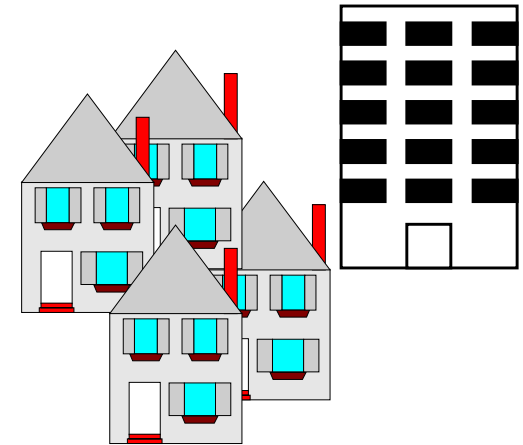
Standard starter

- Lifts / Escalators

Type 2 coordination

- Toxic fume extractor fan

High performance starter



### 6] Features

#### ■ Type 2 Coordination

#### ➤ Application example in industrial Sector

■ Packing line

Type 1 coordination

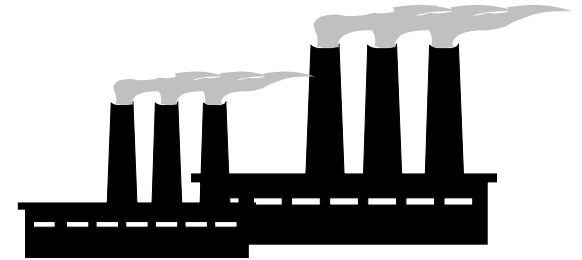
Standard starter

■ Bottling line

Type 2 coordination

■ Petrochemical process

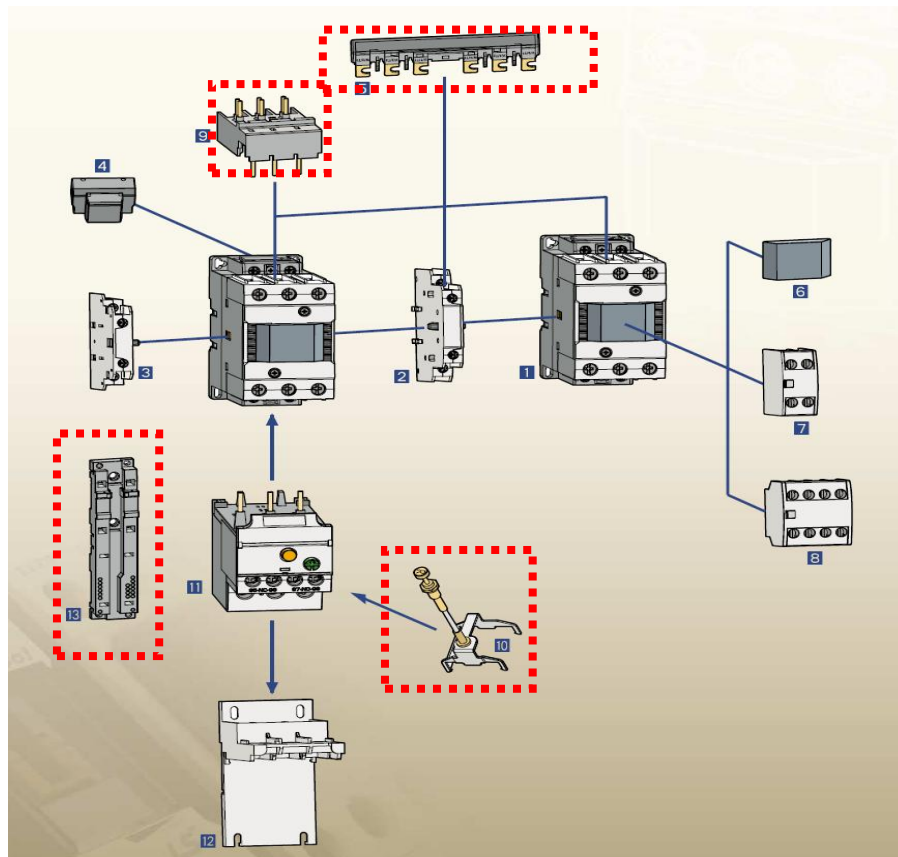
High performance starter



### 7] Accessories

- 1] Performance
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- Auxiliary contact
- Surge unit
- Capacitor unit
- Interlock wire unit
- Mechanical wire kit
- Remote reset unit
- Director adaptor
- Mounting unit



1] Performance

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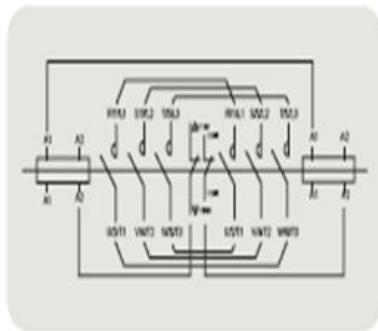
8] Certificates

## ➤ Reversing MC

- Reversing MC is a combination of two standard MCs with a mechanical interlock unit.
- Applications are for forwarding, reversing, reverse phase breaking, constant, instant and transfer operation motor.

## ➤ Description

- Two AC or DC control contactors are interlocked mechanically and electrically
- 3-pole(NO) main contact in each contactor
- Finger proof design
- Front/side mountable accessories available
- Overload relay can be directly mounted to the contactor if necessary



Circuit Diagram



MC-40a/R



MC-65a/R



MC-100a/R

### 7] Accessories

#### Reversing MC

Type	AC-3 duty (KW)						Current	Weight (AC control)
	200~240V	380~400V	415V	440V	500V	690V	440V (A)	
MC-6a/R	2.2	3	3	3	3	3	7	0.63kg
MC-9a/R	2.5	4	4	4	4	4	9	0.63kg
MC-12a/R	3.5	5.5	5.5	5.5	7.5	7.5	12	0.63kg
MC-18a/R	4.5	7.5	7.5	7.5	7.5	7.5	18	0.63kg
MC-9b/R	2.5	4	4	4	4	4	9	0.75kg
MC-12b/R	3.5	5.5	5.5	5.5	7.5	7.5	12	0.75kg
MC-18b/R	4.5	7.5	7.5	7.5	7.5	7.5	18	0.75kg
MC-22b/R	5.5	11	11	11	15	15	25	0.75kg
MC-32a/R	11	18.5	18.5	18.5	22	22	32	0.95kg
MC-40a/R	11	18.5	18.5	18.5	22	22	40	0.95kg
MC-50a/R	15	22	22	22	30	30	50	1.7kg
MC-65a/R	18.5	30	30	30	33	33	65	1.7kg

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### 7] Accessories

#### Reversing MC

Type	AC-3 duty (KW)						Current	Weight (AC control)
	200~240V	380~400V	415V	440V	500V	690V	440V (A)	
MC-75a/R	22	37	37	37	37	37	75	3.3kg
MC-85a/R	25	45	45	45	45	45	85	3.3kg
MC-100a/R	30	55	55	55	55	45	100	3.3kg
MC-130a/R	37	60	60	60	60	55	120	4.3kg
MC-150a/R	45	75	75	75	75	55	150	4.3kg
MC-185a/R	55	90	90	90	110	110	185	13kg
MC-225a/R	75	132	132	132	132	140	225	13kg
MC-265a/R	80	147	147	147	147	160	265	21.4kg
MC-330a/R	90	160	160	160	160	200	330	21.4kg
MC-400a/R	125	200	200	200	225	250	400	21.4kg
MC-500a/R	147	265	265	265	265	300	500	60kg
MC-630a/R	190	330	330	330	330	400	630	60kg
MC-800a/R	220	440	440	440	440	500	800	60kg

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### 7] Accessories

#### Capacitor MC

- Capacitor is adjusted for switching single-step or multiple-step condenser bank.

#### Description

- Capacitor unit(Pre-loading register) is connected to the terminals of the contactor to reduce the high inrush current exceeding  $20 \cdot I_n$ .
- AC or DC control coil on selection
- 3-pole(NO) main contact
- Finger proof design
- DIN rail or screw mountable

Type	Maximum operating power (Kvar)			Rated Current (A)	Capacitor unit type
	220~240V	400~440V	600~550V		
MC-9a/9b(D)	5	9.7	14	14	AC-9
MC-12a/12b(D)	6.7	12.5	18	18	AC-9
MC-18a/18b(D)	8.5	16.7	24	24	AC-9
MC-22b(D)	10	18.	26	26	AC-9
MC-32b(D)	15	25	36	36	AC-9
MC-40a(D)	20	33.3	48	48	AC-9
MC-50a(D)	20	40	58	58	AC-50
MC-65a(D)	25	45.7	66	66	AC-50
MC-75a (D)	29.7	54	78	78	AC-50
MC-85a(D)	35	60	92	92	AC-50
MC-100a (D)	37	62	94	94	AC-50



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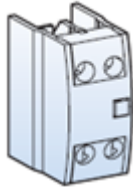
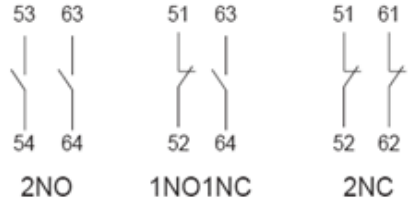
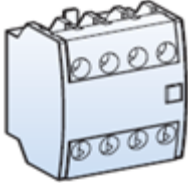
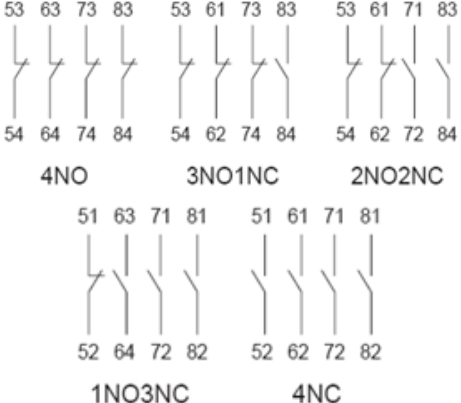
8] Certificates

### 7] Accessories

#### Auxiliary Contact Units

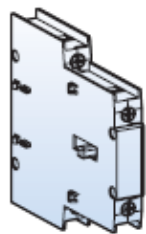
- Side or front mountable unit
- Common use for all Metasol contactors

- 1] Performance
- 2] Structure
- 3] Numbering system
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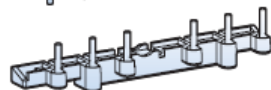
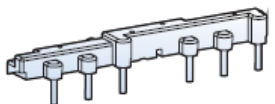
Type	Appearance	Pole	Composition		Contact Arrangement	Mount	Weight (g)
			NO	NC			
UA-1		2	1	1	 <p>13(43) 21(31) 14(44) 22(32) 1NO1NC</p>	Side	53
AU-2		2	2 1 -	- 1 2	 <p>53 63 51 63 51 61 54 64 52 64 52 62 2NO 1NO1NC 2NC</p>	Front	25
AU-4		4	4 3 2 1 -	- 1 2 3 4	 <p>53 63 73 83 53 61 73 83 53 61 71 83 54 64 74 84 54 62 74 84 54 62 72 84 4NO 3NO1NC 2NO2NC 51 63 71 81 51 61 71 81 52 64 72 82 52 62 72 82 1NO3NC 4NC</p>	Front	50

### 7] Accessories

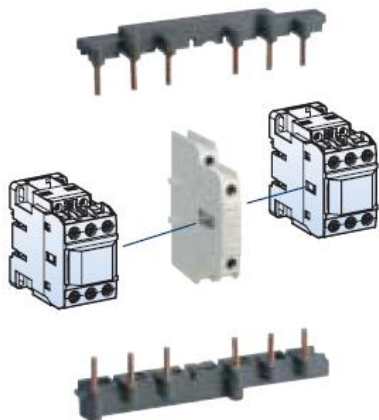
#### Interlock & Wire Kit



Interlock unit



Wire kit



#### Interlocks

Component parts for assembling by customer

#### Interlock unit, UR-02

UR-02 is a mechanical interlock unit and provides 2NC contacts for use in electrical interlocking

#### Wire kit UW

UW is used for making reversing circuit between two contactors

Contactor	Wire kit		Interlock unit	
	Type	Weight g	Type	Weight g
MC-6a~22a	UW-18	50	UR-02	64
MC-9a~22b	UW-18	50		
MC-32a~40a	UW-32	45		
MC-50a, 65a	UW-63	120		
MC-75a~100a	UW-95	325		

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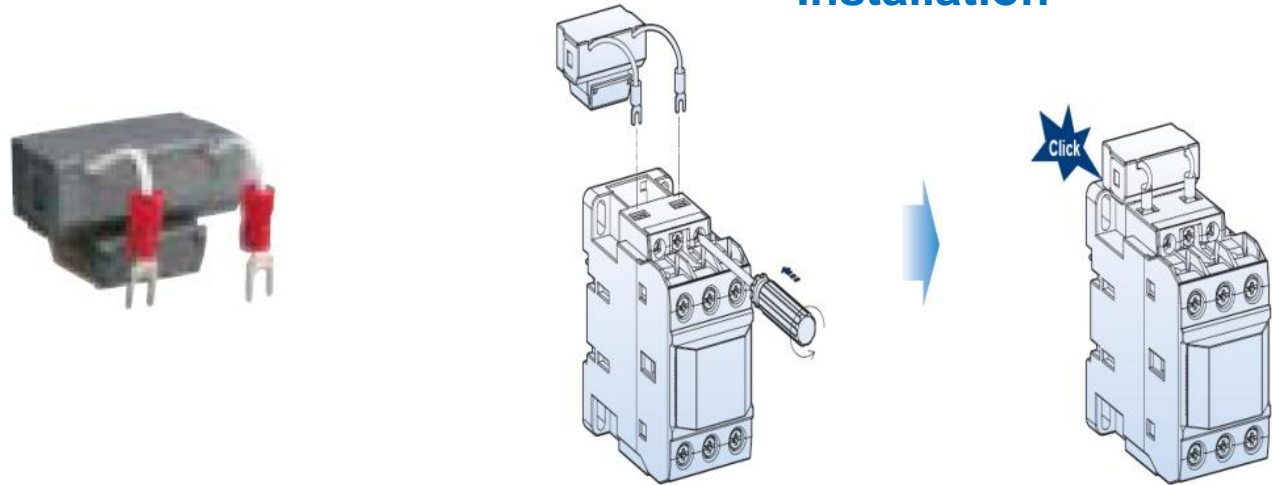
### 6] Accessories

#### ➤ Surge Unit

**It absorbs the surge arisen out of the coil of the contactor.  
It can be installed simply to the contactor.**

- **Rated operation voltage (Ue): AC 24~440V  
DC 24~125V**
- **Rated impulse withstand voltage (Uimp): 8kV**
- **Degree of protection: IP20**

#### Installation



### 6] Accessories

#### Replacement Coils

To replace the existing coil to change voltage or repair.



Contactor	Coil Voltage							
	AC coil						DC coil	
	AC 60Hz(V)		AC 50HZ (V)		AC 50/60Hz(V)		DC (V)	
MC-6a MC-9a MC-12a MC-18a								
MC-9a	24	230	24	230	24	240	12	110
MC-12a	48	240	36	240	48	390	20	125
MC-18a	100	277	42	380	100	415	24	200
MC-22a	110	380	48	400	110	440	48	220
MC-32a	120	440	80	415	120	500	60	250
MC-40a	200	480	100	440	200	550	80	
MC-50a	208	600	110	500	220		100	
MC-65a	220		220	550	230			
MC-75a MC-95a MC-100a								
MC-130a MC-150a		-		-	24 48 110 220	300 400 500	24 48	110 220

1] Performance

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### 6] Accessories

#### Replacement Coils

To replace the existing coil to change voltage or repair.



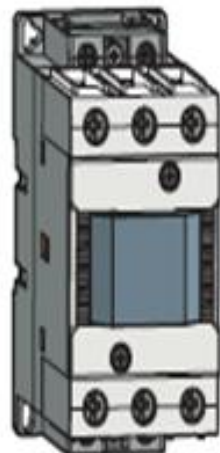
Contactor	Coil Voltage	
	AC/DC Common coil	AC coil
MC-185a MC-225a	24 48 100~240/100~220	300 400 500
MC-265a MC-300a MC-400a	100~240/100~220	300 400 500
MC-500a MC-630a MC-800a	100/100 200/200	300 400 500

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### 7] Accessories

#### ■ Safety Cover (Option)

- To prevent arc from coming out from the contactor
- To protect from unintended manual operation
- To prevent dust from entering into the inside of the contactor



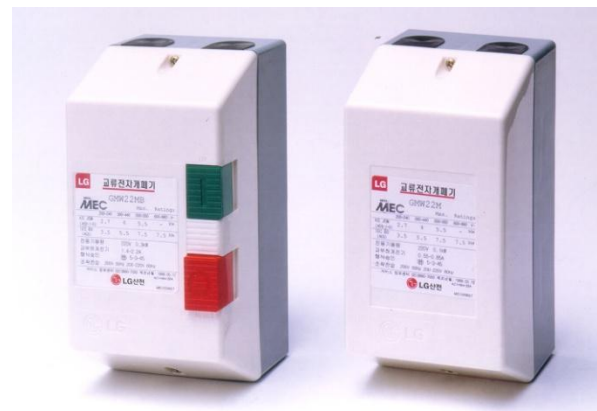
Type	Contactors
AP-9	All types



### 7] Accessories

#### Enclosure (Under development)

Type	Model	Remark
Metal enclosure without button	GMW-9~85a	
Metal enclosure with button	GMW-9B~85B	On-Off button
Plastic enclosure without button	GMW-9M~22M	
Plastic enclosure with button	GMW-9MB~22MB	On-Off button



### 7] Accessories

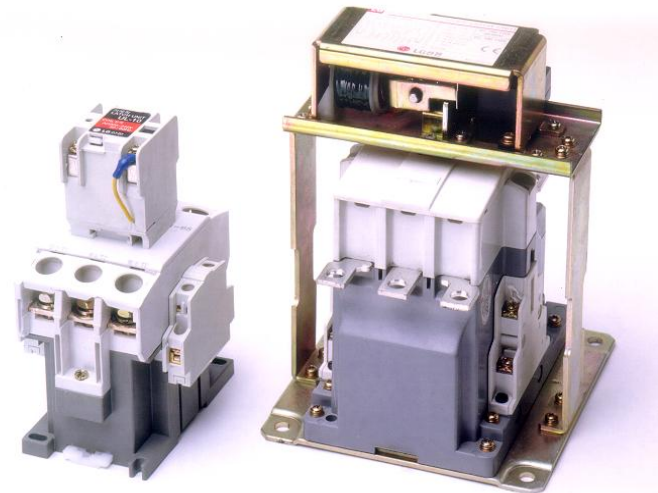
#### ☑ Latch Unit (Under development)

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#### ➤ Latch unit device

The mechanical latch unit maintains the main contacts in the closed condition after the coil power has been removed.

Main contacts are opened via the rebound coil.



### 7] Accessories

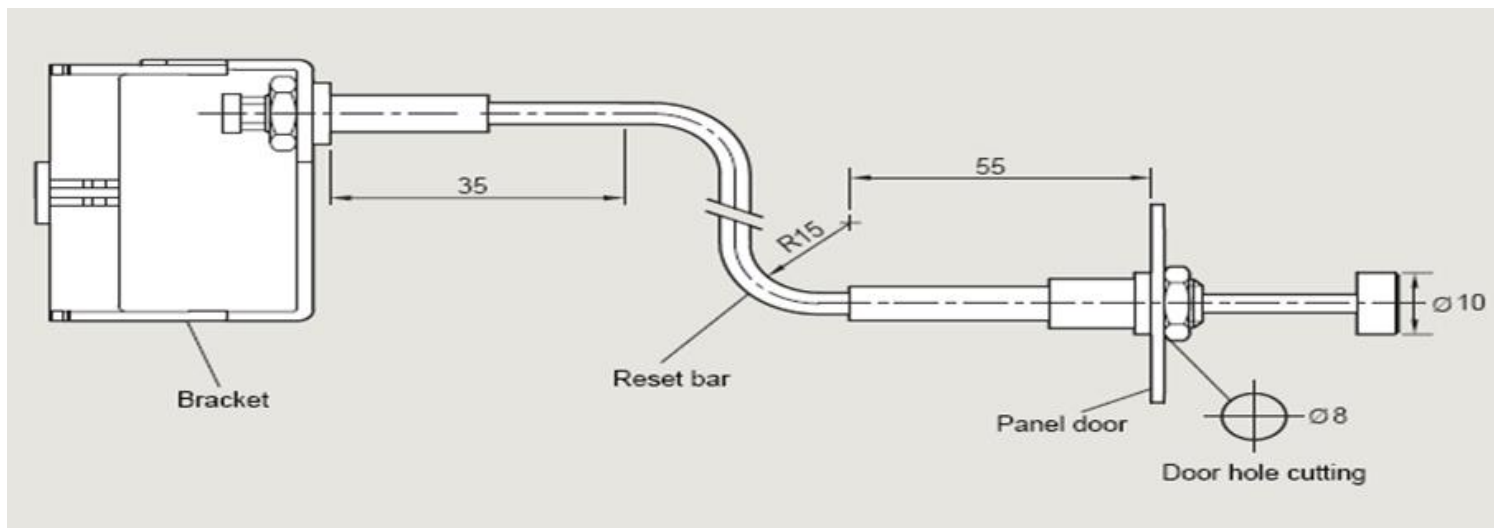
#### Remote reset Unit for TOR

These accessories are used to reset the relays on the panel door.



Type	Cable length (L)
UM-4R	400 mm
UM-5R	500 mm
UM-6R	600 mm

1. Make the reset bar straight at least 55mm from the panel door and 35mm from the bracket.
2. The bending radius of the flexible reset bar should not be less than 15mm.



### 7] Accessories

#### Separate Mounting Unit For TOR

These accessories are used to mount the relays separately from contactors. If a relay is combined with a unit, it can be mounted on DIN rail or panel by fixing screws.



Relay	Unit	
	Type	Weight
MT-32/2H□ MT-32/3H□ MT-32/3K□ MT-32/3D□	UZ-32	38g
MT-63/2H□S MT-63/3H□S MT-63/3K□S MT-63/3D□S	UZ-63/S	134g
MT-95/2H□S MT-95/3H□S MT-95/3K□S MT-95/3D□S	UZ-95/S	230g
MT-150/2H□ MT-150/3H□ MT-150/3K□ MT-150/3D□	UZ-150/S	284g

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### 8] Certificates

- KEMA approval (Applied Standard IEC 60947-4)
- UL listed (UL508)
- Marine approval (LR, BV, NK, KR)-2010

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