

Capacitor contactors

Description

Capacitor unit(Pre-loading resistor) is connected to the terminals of the contactor to reduce the high inrush current exceeding $20 \times I_n$.

- AC or DC control coil on selection
- 3-pole(NO) main contact
- Finger proof design
- DIN rail or screw mountable
- IEC 60947-4-1 AC 6b

Rating

Type	Rating (kVar, A)			Rating thermal current (Ith)
	220 ~ 240V	400 ~ 440V	500 ~ 550V	
MC-9b with AC-9	5kVar	9.7kVar	14kVar	21.6A
	13A	14A	16A	
MC-12b with AC-9	6.7kVar	12.5kVar	18kVar	28.4A
	18A	18A	21A	
MC-18b with AC-9	8.5kVar	16.7kVar	24kVar	37.8A
	22A	24A	28A	
MC-22b with AC-9	10kVar	18kVar	26kVar	40.5A
	26A	26A	30A	
MC-32a with AC-9	15kVar	25kVar	36kVar	56.1A
	39A	36A	42A	
MC-40a with AC-9	20kVar	33.3kVar	48kVar	74.8A
	52A	48A	55A	
MC-50a with AC-50	20kVar	40kVar	58kVar	90.4A
	52A	58A	67A	
MC-65a with AC-50	25kVar	45.7kVar	66kVar	102.9A
	66A	66A	76A	
MC-75a with AC-50	29.7kVar	54kVar	78kVar	121.6A
	78A	92A	97A	
MC-85a with AC-50	35kVar	60kVar	92kVar	143.4A
	92A	87A	106A	
MC-100a with AC-50	37kVar	62kVar	94kVar	146.5A
	90A	106A	109A	

Note) - When the switch is closed condenser must be discharged before recharged. (Maximum residual voltage at terminals $\leq 50V$)
 - To prevent short current, gG type fuse must be 1.5~2 times than rated current.
 - AC-50 is including screw type and lug type.



Coil voltage

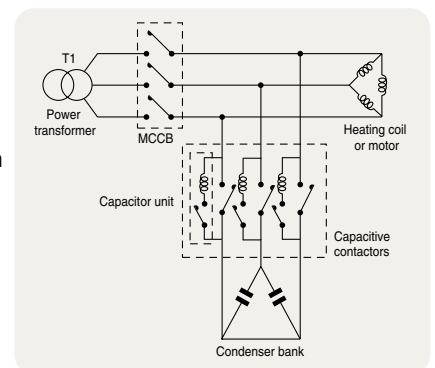
AC	50Hz	24, 32, 42, 48, 80, 100, 110, 220, 230, 240, 380, 400, 500, 550V
	60Hz	24, 48, 100, 110, 120, 200, 208, 220, 230, 240, 277, 380, 480, 600V
DC	DC	12, 20, 24, 48, 60, 80, 100, 110, 125, 200, 220, 250V

These capacitive contactors are suitable for switching single-step or multiple-step condenser bank.

It is standardized by IEC-60947-4941, UL and CSA.

Features of capacitor unit(Pre-loading resistor)

- Damping resistor that can limit the inrush current upto $60 \times I_n$ is connected to the mechanism that closed earlier than the main contact of the contactor
- No heat loss by the serial resistor
- Eliminate the switching surge
- Improving the performance of the capacitor system



Example

Capacitor unit



Capacitor unit is connected to the terminals of the contactor to reduce the high inrush current.
IEC 60947-4-1 AC 6b

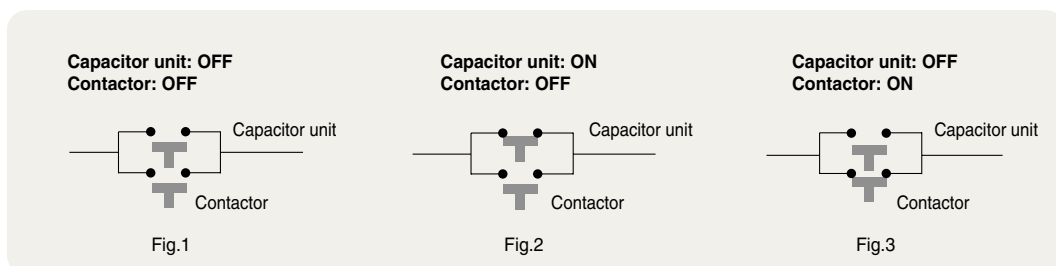
Type				AC-9 (1b)	AC-50 (1b)
Rating thermal current (I _{th})				16A	16A
Current	AC-15	Rated Operational Current (A)	120V	6	6
			240V	3	3
			380V	1.9	1.9
			480V	1.5	1.5
			500V	1.4	1.4
			600V	1.2	1.2
	DC-13	Rated Operational Current (A)	125V	0.55	0.55
			250V	0.27	0.27
			400V	0.15	0.15
			500V	0.13	0.13
			600V	0.1	0.1

Note) - When the switch is closed condenser must be discharged before recharged. (Maximum residual voltage at terminals $\leq 50V$)
- To prevent short current, gG type fuse must be 1.5~2 times than rated current.

Features of capacitor unit (Pre-loading resistor)

- Damping resistor that can limit the inrush current upto $60 \times I_n$ is connected to the mechanism that closed earlier than the main contact of the contactor
- No heat loss by the serial resistor
- Eliminate the switching surge
- Improving the performance of the capacitor system

Operation sequence



Note) Closing sequence: Fig.1 => Fig.2 => Fig.3
Opening sequence: Fig.3 => Fig.1

Auxiliary contact units

- 2 pole
- Side mountable
- Common use for Metasol contactors from MC-185a to MC-800a
- Auxiliary contact meet the requirements for mirror contacts in IEC 60947-4-1. Annex F
(A mirror contact is an auxiliary NC contact that cannot be closed simultaneously with a NO main contact)



Selection

Type	Appearance	Pole	Composition		Contact arrangement	Mount	Weight
			NO	NC			
AU-100 AU-100E		2	1	1		Side	53g

Maximum combination of contact units

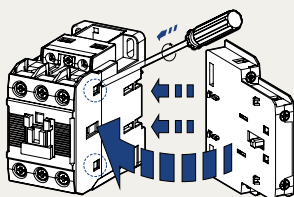
MC-185a~800a (Max. 4a4b)
AU-100×4EA (2EA on both sides)
AU-100E×4EA (2EA on both sides)

Rating

Type		UA-1	UA-2, 4	UA-1, 2, 4 Low	AU-100	AU-100E
Rated operation voltage (Ue)		600V	600V	600V	600V	60V
Rated insulation voltage (Ui)		600V	600V	600V	600V	600V
Rated impulse withstand voltage (Uimp)		6kV	6kV	6kV	6kV	6kV
Rated frequency		50/60Hz	50/60Hz	50/60Hz	50/60Hz	50/60Hz
Contact sensibility						
	Voltage	DC 17V	DC 24V	DC 5V	DC 24V	DC 7V
	Current	DC 5mA	DC 10mA	DC 3mA	DC 10mA	DC 5mA
Rated thermal current (Ith, AC12 duty)		10A	16A	16A	16A	1A
Rated operation current						
AC15 duty (A600)	120V	6A	6A	6A	6A	AC/DC 24V 0.1A AC/DC 50V 0.01A
	240V	3A	3A	3A	3A	
	380V	1.9A	1.9A	1.9A	1.9A	
	480V	1.5A	1.5A	1.5A	1.5A	
	500V	1.4A	1.4A	1.4A	1.4A	
	600V	1.2A	1.2A	1.2A	1.2A	
	DC13 duty (Q600)	125V	1.1A	1.1A	1.1A	
	250V	0.55A	0.55A	0.55A	0.55A	
	400V	0.31A	0.31A	0.31A	0.31A	
	500V	0.27A	0.27A	0.27A	0.27A	
	600V	0.2A	0.2A	0.2A	0.2A	
Rated	1s	100A	-	-	100A	-
Short-time	0.5s	125A	-	-	120A	-
withstand current	0.1s	145A	-	-	140A	-
Electrical lifetime (mil. operations)						
AC15 duty	220V	0.25	0.25	0.25	0.25	1
	440V	0.25	0.25	0.25	0.25	
	DC13 duty	220V	0.25	0.25	0.25	
	440V	0.25	0.25	0.25	0.25	
Maximum operating cycles per hour		1800	1800	1800	1800	1200
Conductor size (Solid, stranded)	AWG	18~10	18~10	18~10	18~10	18~10
	(the max. number of conducts: 2) mm ²	1~2.5	1~2.5	1~2.5	1~2.5	1~2.5

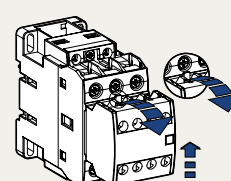
Installation

UA-1



To install side mounting unit remove the indicated part in the circle in the fig. first. And then fit each part as shown. To separate push forward and pull.

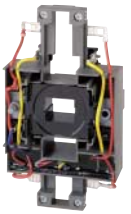
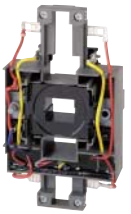
UA-2, 4



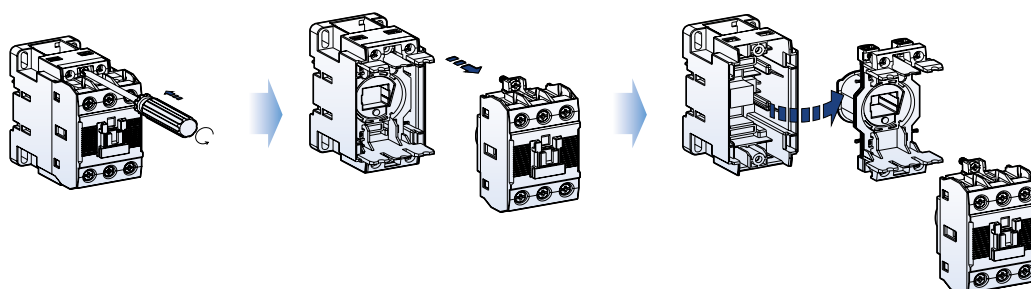
To install front mounting unit fit it on the upper part of the front of the contactor and push it down. To separate pull the lever of the unit and push the unit upward.

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 MR-4, 6, 8	24	230	24	230	24	240
	48	240	36	240	48	380
	100	277	42	380	100	415
	110	380	48	400	110	440
	120	440	80	415	120	500
	200	480	100	440	200	550
	208	600	110	500	220	
 MC-9b MC-12b MC-18b MC-22b	24	230	24	230	24	240
	48	240	36	240	48	380
	100	277	42	380	100	415
	110	380	48	400	110	440
	120	440	80	415	120	500
	200	480	100	440	200	550
	208	600	110	500	220	
 MC-32a MC-40a	24	230	24	230	24	240
	48	240	36	240	48	380
	100	277	42	380	100	415
	110	380	48	400	110	440
	120	440	80	415	120	500
	200	480	100	440	200	550
	208	600	110	500	220	
 MC-50a MC-65a	24	230	24	230	24	240
	48	240	36	240	48	380
	100	277	42	380	100	415
	110	380	48	400	110	440
	120	440	80	415	120	500
	200	480	100	440	200	550
	208	600	110	500	220	
 MC-75a MC-85a MC-100a	24	230	24	230	24	240
	48	240	36	240	48	380
	100	277	42	380	100	415
	110	380	48	400	110	440
	120	440	80	415	120	500
	200	480	100	440	200	550
	208	600	110	500	220	
 MC-130a MC-150a	24	230	24	230	24	240
	48	240	36	240	48	380
	100	277	42	380	100	415
	110	380	48	400	110	440
	120	440	80	415	120	500
	200	480	100	440	200	550
	208	600	110	500	220	
	220		220	550	230	
					24	110
					48	220
					100~240	400~440
					110~120	500

Replacement process



To replace the existing coil to change voltage or repair.



Contactor	Coil voltage	
	AC/DC common coil (V)	AC coil (V)
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

Safety cover (Option)

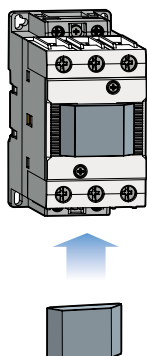
To prevent arc from coming out from the contactor

To protect from unintended manual operation

To prevent dust from entering into the inside of the contactor



Type	Contactor
AP-9	MC-6a~150a
AP-185	MC-185a~800a



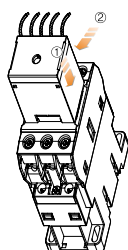
Delayed opening devices, AD

Delayed opening device prevents the inadvertent opening of a contactor in the event of a wide voltage drop or brief supply voltage interruptions of control power for 1 to 4 seconds.



Applying contactors	Type	Control voltage
MC-6a~40a, MC-9b~22b	AD-9	AC 220V
		AC 110V
MC-50a~100a	AD-50	AC 220V
		AC 110V
MC-130a~225a	AD-100	AC 100~240V
MC-265a~400a	AD-300	AC 100~240V
MC-500a~800a	AD-600	AC 100~127V
		AC 200~240V

Electronic timer unit, UT



① Insert to ① way ② Push to ② way and assemble

Applying contactors	Type	Rated voltage	Performance
MC-6a~150a	On delay	UT-1N	- Mounting: Head on - Contact: 1c - Time delay: 1 Sec~30 Sec On delay, Off delay - Frequency: AC 50/60Hz - Operation: Min. voltage 85%, Max. voltage 110% - Accuracy of setting time: $\pm 20\%$
		UT-2N	
MC-9b~22b	Off delay	UT-1F	
		UT-2F	

Terminal cover units for contactors, AP



Applying contactors	Type	Remarks
MC-185a, 225a (225AF)	AP-220	2 pcs included
MC-265a, 330a, 400a (400AF)	AP-400	
MC-500a, 630a, 800a (800AF)	AP-800	

Insulation barrier units, AI



Applying contactors	Type	Remarks
MC-185a, 225a (225AF)	AI-180	4 pcs required per contactor
MC-265a, 330a, 400a (400AF)		
MC-500a, 630a, 800a (800AF)	AI-600	

Surge unit



US Type



AS Type

It absorbs the surge arisen out of the coil of the contactor.

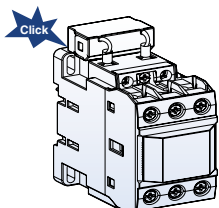
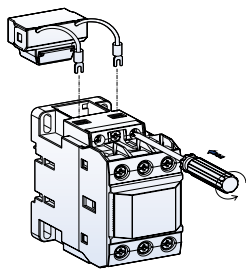
It can be installed simply to the contactor.

- Rated operation voltage (Ue): AC 24 ~ 440V / DC 24 ~ 125V
- Rated insulation voltage (Ui): 1000V
- Rated impulse withstand voltage (Uimp): 8kV
- Degree of protection: IP20
- Combination with 3Pole 6a/3~150a/3, 4Pole 32a/4~85a/4

US Type

Surge unit		Rated voltage		Internal elements spec.			Contactor
Type	Composition			V	R	C	
US-1	Varistor+RC	AC	24~48V	120V	100Ω	0.1μF	3Pole MC 6a~150a 9b~22b
US-2	Varistor+RC		100~125V	270V	100Ω	0.1μF	
US-3	Varistor+RC		200~240V	470V	100Ω	0.1μF	
US-4	Varistor+RC	DC	24~48V	120V	100Ω	0.47μF	
US-5	Varistor+RC		100~125V	270V	100Ω	0.47μF	
US-6	Varistor+RC		200~220V	470V	100Ω	0.47μF	
US-11	Varistor	AC/DC common	24~48V	120V	-	-	
US-12	Varistor		100~125V	270V	-	-	
US-13	Varistor		200~240V	470V	-	-	
US-14	Varistor		380~440V	1000V	-	-	
US-22	RC	AC	100~125V	-	56Ω	1μF	

Installation (US Type)



Connect the lead wires to the coil terminals of the contactor first. And then insert the body into the space of the contactor as shown above.

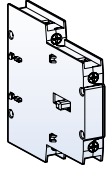
AS Type

Surge unit		Rated voltage		Internal elements spec.			Contactor
Type	Composition			V	R	C	
AS-1	Varistor+RC	AC	24~48V	120V	100Ω	0.1μF	3Pole MC 185a~800a 4Pole MC 22a/4~800a/4
AS-2	Varistor+RC		100~125V	270V	100Ω	0.1μF	
AS-3	Varistor+RC		200~240V	470V	100Ω	0.1μF	
AS-4	Varistor+RC	DC	24~48V	120V	100Ω	0.47μF	
AS-5	Varistor+RC		100~125V	270V	100Ω	0.47μF	
AS-6	Varistor+RC		200~220V	470V	100Ω	0.47μF	
AS-11	Varistor	AC/DC common	24~48V	120V	-	-	
AS-12	Varistor		100~125V	270V	-	-	
AS-13	Varistor		200~240V	470V	-	-	
AS-14	Varistor		380~440V	1000V	-	-	

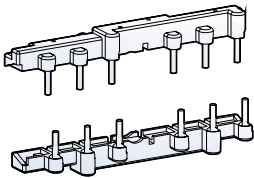
Specitication of surge unit

Without surge unit	① With Varistor unit	② With CR+Varistor unit
Surge voltage, arise when the coil is off, may provoke mis-operation and damage in the circuit.	Varistor has an effect to cut down the peak voltage	Varistor has an effect to cut down the peak voltage and high frequency wave

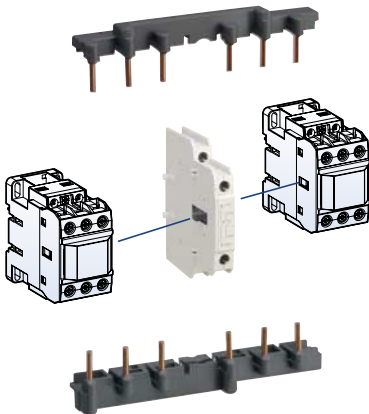
Accessory



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

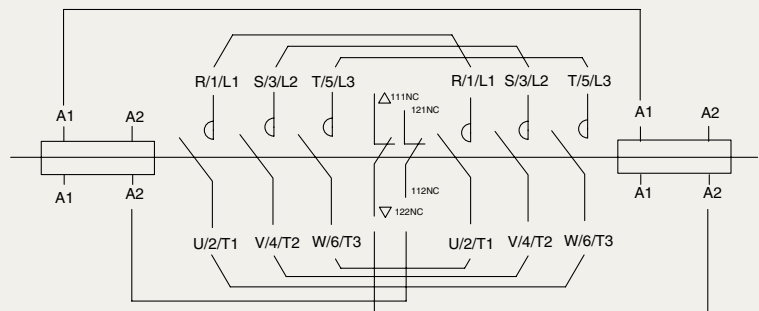
Wire kit, UW

UW is used for making reversing circuit between two contactors.

Contactor	Wire kit		Interlock unit	
	Type	Weight	Type	Weight
MC-6a~18a	UW-18	0.05kg	UR-02	0.06kg
MC-9b~22b	UW-22	0.04kg		
MC-32a~40a	UW-32	0.05kg		
MC-50a, 65a	UW-63	0.12kg		
MC-75a~100a	UW-95	0.33kg		
MC-130a~150a	-	-		

Rating of the contacts in the interlocks

Rated operation voltage		600V
Rated insulation voltage		600V
Rated frequency		50/60Hz
Rated thermal current		10A
Rated operation current		
AC15 duty (A600)	120V	6A
	240V	3A
	380V	1.9A
	480V	1.5A
	500V	1.4A
	600V	1.2A
DC13 duty (Q300)	125V	0.55A
	250V	0.27A



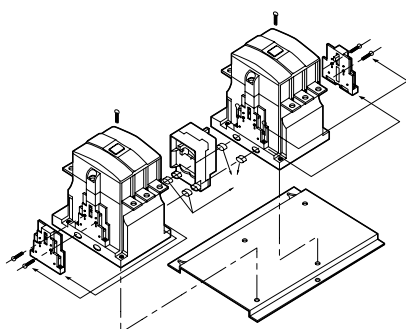
<MC-6aR ~ MC-150aR typical circuit diagram for reversing contactor>



AR-180



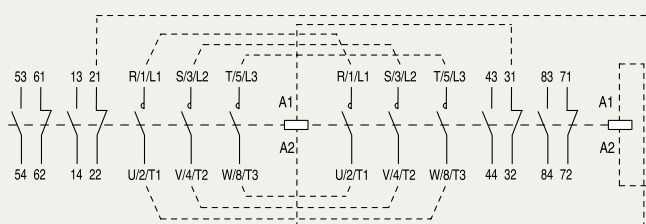
AR-600



Interlock unit, AR-180 and AR-600

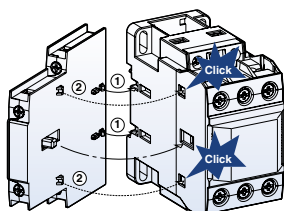
AR-180 and AR-600 are mechanical interlock units in which electrical contacts for use in electrical interlocking are not included. Please use the auxiliary contacts on the sides of the contactors for that purpose.

Contactor	Interlock unit	
	Type	Weight
MC-180a MC-225a MC-265a MC-330a MC-400a	AR-180	0.09kg
MC-500a MC-630a MC-800a	AR-600	15.2kg

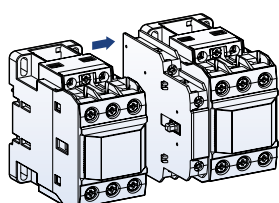


<MC-180aR ~ MC-800aR typical circuit diagram for reversing contactor>

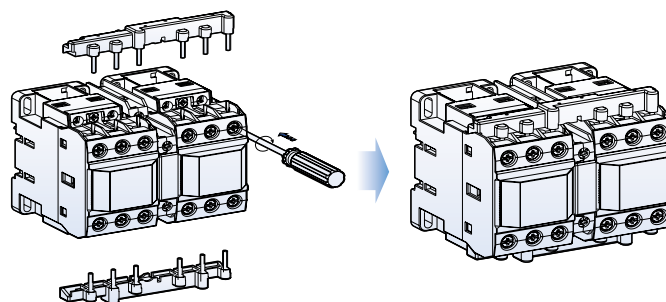
Installation of Interlock and Wire kits



Install the interlock unit on the side of a contactor first. Fit each part as indicated in the fig.



And then install the other contactor on the other side of the interlock unit as shown.



After installing interlock unit wiring kit can be assembled.

Wiring kit contains two molded wires - one for line side and the other for load side.