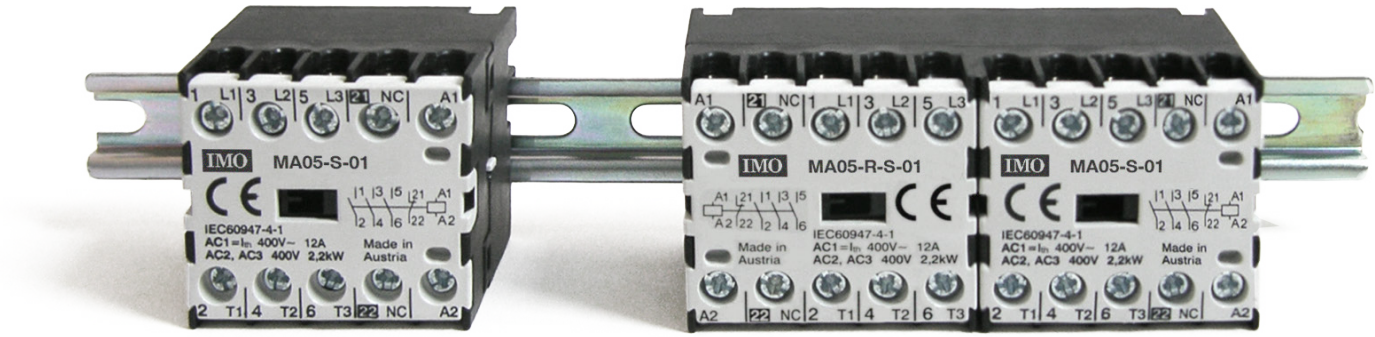
Micro Contactor MA Series

- Relay-sized contactor, making it the world's smallest
- >3mm contact clearance acc. to IEC 60335-1 for Safety Applications
- Reversing contactor with mechanical interlock
- 3 Pole and 1 Aux. Contact NO or NC
- 5A AC3 @ 400VAC (2.2kW) - 12A AC1 @ 400VAC
- AC coil voltages - TS15 DIN rail mounting
- PCB mounting
- DC coil pending



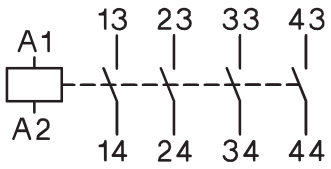
Micro Contactor MA Series

Micro Contactor Relays 4-Pole

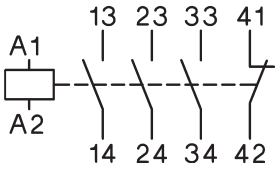
AC Operated

Ratings Therm.		Contacts *2					**Type**	Coil Voltage *1	
					Distinc. Number	Additional Contact		**24** 24V 50/60Hz **230** 220-240V 50/60Hz	
AC15		Rated-Current							
230V A	400V A	I_{th} A	NO	NC	acc. to EN50011	Blocks Type		↓	Pack pcs. / Weight kg/pc.
4-Pole, With Screw Terminals									
3	1.5	5	4	-	40E	-	MA04-S-40	...	10 / 0.07
3	1.5	5	3	1	31E	-	MA04-S-31	...	10 / 0.07
3	1.5	5	2	2	22E	-	MA04-S-22	...	10 / 0.07

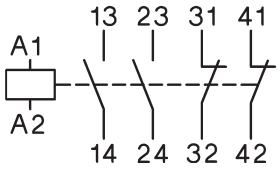
MA04-S-40



MA04-S-31



MA04-S-22



*1 Other coil voltages - see page 4

*2 Contacts suitable for electronic circuits, according to EN947-5-4 for rated voltage 24V DC (test ratings 17V DC, 5mA). Positively guided contacts.

Micro Contactor MA Series

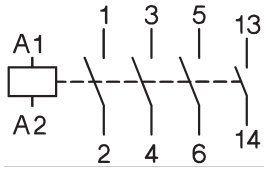
Micro Contactors

AC Operated

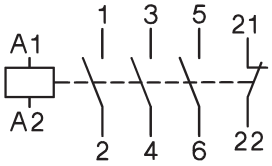
Power Ratings AC2, AC3 380V 400V 415V kW	660V 690V kW	Rated Current AC1 440V A	Aux. Contacts*2 Built-in NO	Built-in NC	Additional Type	Type	Coil Voltage *1 ↓	Pack pcs.	Weight kg/pc.
3-Pole, With Screw Terminals									
2.2	-	12	1	-	-	MA05-S-10	...	10	0.07
2.2	-	12	-	1	-	MA05-S-01	...	10	0.07
4-Pole, With Screw Terminals									
2.2	-	12	-	-	-	MA05-S-0040	...	10	0.07

Coil Voltage *1
24 24V 50/60Hz
230 220-240V 50/60Hz

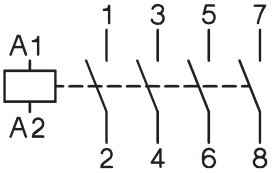
MA05-S-10



MA05-S-01

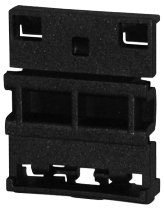


MA05-S-0040



Snap-On Adaptor

For Type	Specification	Type	Pack pcs.	Weight kg/pc.
MA	for snap mounting of **Snap on Adaptor for MA** accessories on 35mm DIN-Rail acc. DIN EN 50022	MA-P1039	10	0.01



*1 Other coil voltages - see page 4
*2 Contacts suitable for electronic circuits, according to EN947-5-4 for rated voltage 24V DC (test ratings 17V DC, 5mA). Positively guided contacts.

Micro Contactor MA Series

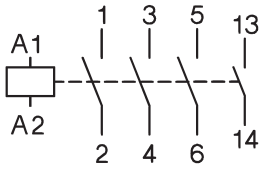
Micro Contactors

AC Operated

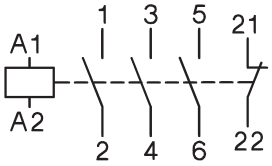
Power Ratings AC2, AC3		Rated Current AC1	Aux. Contacts*2 Built-in		Additional	Type	Coil Voltage *1	Pack pcs.	Weight kg/pc.
380V 400V 415V kW	660V 690V kW	440V A	NO	NC	Type		↓		
3-Pole, With Solder Pins Ø1.15 For Printed Circuit Applications									
2.2	-	9	1	-	-	MA05-P-10	...	10	0.07
2.2	-	9	-	1	-	MA05-P-01	...	10	0.07
4-Pole, With Solder Pins Ø1.15 for Printed Circuit Applications									
2.2	-	9	-	-	-	MA05-P-0040	...	10	0.07

24 24V 50/60Hz
230 220-240V 50/60Hz

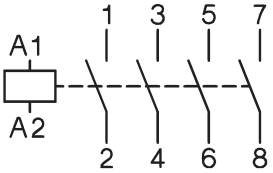
MA05-P-10



MA05-P-01



MA05-P-0040



Coil Voltages for AC operated contactors

Suffix to contactor type e.g. MA05-S-1024AC	Voltage Marking at the coil for 50Hz V	for 60Hz V	Rated Control Voltage U_s range for 50Hz min. V	max. V	for 60Hz min. V	max. V
12	12	12	11	12	12	12
24	**24**	**24**	**22**	**24**	**24**	**24**
42	42	42	38.5	42	42	42
48	48	48	48	50	48	52
90	100	100	90	100	100	105
95	95-100	105-110	95	100	105	110
100	100	110-115	100	105	110	115
105	105-110	115-120	105	110	115	120
110	110-115	120-125	110	115	120	125
180	200	200	185	200	200	210

Suffix to contactor type e.g. MA05-S-10230AC	Voltage Marking at the coil for 50Hz V	for 60Hz V	Rated Control Voltage U_s range for 50Hz min. V	max. V	for 60Hz min. V	max. V
200	200	200-220	195	205	200	220
210	205-215	220-230	205	215	220	230
220	210-220	220-240	210	220	220	240
230	**220-230**	**230-250**	**220**	**230**	**230**	**250**
240	230-240		230	240	250	260

Standard voltages in bold type letters
Operating range of magnet-coils: 0.85 x U_s (min value of rated control voltage) up to 1.1 x U_s (max value of rated control voltage)

Coil not exchangeable

*1 Other coil voltages - see above
*2 Contacts suitable for electronic circuits, according to EN947-5-4 for rated voltage 24V DC (test ratings 17V DC, 5mA). Positively guided contacts.

Micro Contactor MA Series

Micro Reversing Contactors, Mechanical Interlock

AC Operated

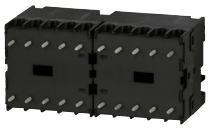
Power Ratings

380V 400V 415V kW	660V 690V kW	Rated Current 440V A	Aux. Contacts*2 Built-in NO	NC	Additional on the left hand side contactor K1 Type	on right hand side contactor K2 Type	Type	↓	Pack pcs.	Weight kg/pc.
AC2, AC3		AC1								
3-Pole, With Screw Terminals										
2.2	-	12	-	1	-	-	MA05-R-S-01	...	1	0.14
2.2	-	12	1	-	-	-	MA05-R-S-10	...	1	0.14
4-Pole, With Screw Terminals										
2.2	-	12	-	-	-	-	MA05-R-S-0040	...	1	0.14
3-Pole, With Solder Pins Ø1.15 For Printed Circuit Applications										
2.2	-	xxx*3	-	1	-	-	MA05-R-P-01	...	1	0.14
2.2	-	xxx*3	1	-	-	-	MA05-R-P-10	...	1	0.14

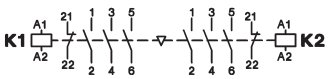
Coil Voltage *1

24 24V 50/60Hz

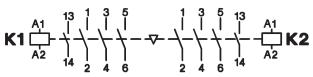
230 220-240V 50/60Hz



MA05-R-S-01



MA05-R-S-10



MA05-R-S-0040

*1 Other coil voltages - see page 4

*2 Contacts suitable for electronic circuits, according to EN947-5-4 for rated voltage 24V DC (test ratings 17V DC, 5mA). Positively guided contacts.

*3 Data available upon request

Micro Contactor MA Series

Data according to IEC 60947-4-1, VDE 0660, EN 60947-4-1

Main Contacts		Type	**MA05-S..**	**MA05-P..**
Rated insulation voltage U_i		V AC	440*1	440*1
Making capacity I_{eff}	at U_e=440V AC	A	65	65
Breaking capacity I_{eff} cosφ = 0.65	400V AC	A	50	50
Utilization category AC1 Switching of resistive load				
Rated operational current I_e (=I_{th}) at 40°C, open		**A**	**12**	**9**
Rated operational power of three-phase resistive loads	230V	kW	4.7	3.5
50-60Hz, cosφ=1	240V	kW	4.8	3.7
	400V	kW	8.3	3.3
	415V	kW	8.6	6.4
	440V	kW	9	6.8
Rated operational current I_e (=I_{th}) at 60°C, enclosed		A	8	6
Rated operational power of three-phase resistive loads	230V	kW	3.1	2.3
50-60Hz, cosφ=1	240V	kW	3.3	2.4
	400V	kW	5.5	4.1
	415V	kW	5.7	4.3
	440V	kW	6	4.5
Minimum cross-section of conductor at load with I_e (=I_{th})		mm^2	1.5	-
Utilization category AC2 and AC3 Switching is three phase motors				
Rated operational current I_e	220V	A	6.2	6.2
open and enclosed	230V	A	6.2	6.2
	240V	A	5.6	5.6
	380-400V	**A**	**5**	**5**
	415-440V	A	5	5
	480V	A	5	5
Rated operational power of three-phase motors	220-240V	kW	1.5	1.5
50-60Hz	**380-440V**	**kW**	**2.2**	**2.2**
Utilization category AC4 Switching of squirrel cage motors, inching				
Rated operational current I_e	220V	A	4.9	4.9
open and enclosed	230V	A	4.9	4.9
	240V	A	4.1	4.1
	380-400V	**A**	**3.5**	**3.5**
	415-440V	A	3.5	3.5
	480V	A	3.5	3.5
Rated operational power of three-phase motors	220-240V	kW	1.1	1.1
50-60Hz	**380-440V**	**kW**	**1.5**	**1.5**
Utilization category AC5a Switching of gas discharge lamps				
Rated operational current I_e per pole at 220/230V				
Flourescent lamps				
uncompensated and serial compensated		A	6	6
parallel compensated		A	0.5	0.5
dual-connection		A	9	9
Metal halide lamps*2				
uncompensated		A	6	6
parallel compensated		A	0.5	0.5
Mercury vapour lamps*3				
uncompensated		A	9	9
parallel compensated		A	0.5	0.5
Mixed light lamps*4		A	9	9
LED-lamps				
consider the inrush current of the lamp ballast	max. lamps per pole ($I_{nLED} \leq I_{th}$) =		inrush current of connector	
and cosφ of the lamp			inrush current of lamp/EVG	
max. inrush current of contactor		A	91	91
Utilization category AC5b Switching of incandescent lamps*5				
Rated operational current I_e per pole at 220/230V		A	3	3

*1) Suitable at 690V for: earthed-neutral systems, overvoltage category I to III, pollution degree 3 (standard-industry): Uimp = 4kV.
Data for other conditions on request.
*2) Metal halide lamps and sodium-vapour lamps (high- and low-pressure lamps)
*3) High-pressure lamps
*4) Blended lamps, containing a mercury high-pressure unit and a tungsten helix in a flourescent glass bulb (daylight lamps)
*5) Current inrush approx. 16 x Ie

Micro Contactor MA Series

Data according to IEC 60947-4-1, VDE 0660, EN 60947-4-1

Main Contacts			Type	MA05-S..
Utilization category DC1				
Switching of resistive load		1 pole 24V	A	12
Time constant L/R ≤1ms		60V	A	12
Rated operational current I_e		110V	A	-
		220V	A	-
		3 poles in series 24V	A	12
		60V	A	12
		110V	A	12
		220V	A	-
Utilization category DC3 and DC5				
Switching of shunt motors and series motors		1 pole 24V	A	12
		60V	A	-
Time constant L/R ≤15ms		110V	A	-
Rated operational current I_e		220V	A	-
		3 poles in series 24V	A	12
		60V	A	12
		110V	A	12
		220V	A	-
Maximum ambient temperature				
Operation		open	°C	-40 to +60 (+90)[*1]
		enclosed	°C	-40 to +40
with thermal overload relay		open	°C	-25 to +60
		enclosed	°C	-25 to +40
Storage			°C	-50 to +90
Short circuit protection				
for contactors without thermal overload relay				
Coordination-type "1" according to IEC 947-4-1				
Contact welding without hazard of persons		gL (gG)	A	20
max. fuse size				
Coordination-type "2" according to IEC 947-4-1				
Light contact welding accepted		gL (gG)	A	-
max. fuse size				
Contact welding not accepted				
max. fuse size		gL (gG)	A	-
For contactors with thermal overload relay the device with the smaller admissible backup fuse (contactor or thermal overload relay) determines the fuse size				
Cable cross-sections				
for contactors				
main connector		solid or stranded	mm^2	0.5-1.5
		flexible	mm^2	0.5-1.5
		flexible with multicore cable end	mm^2	0.5-1.5
Cables per clamp				2
		solid or stranded	AWG	20-14
Frequency of operation z		without load	1/h	10000
contactors without thermal overload relay		AC3 I_e	1/h	600
		AC4 I_e	1/h	120
		DC3 I_e	1/h	600
Mechanical life	AC operated	S x	10^6	3
	DC operated	S x	10^6	xxx[*2]
Short time current		10s-current	A	50
Power loss per pole		at I_e/AC3 400V	W	0.2
Resistance to shock according to IEC 68-2-27				
Shick time 20ms sine-wave				
AC operated		NO	g	2.5
		NC	g	2.5

*1 With reduced control voltage range 0.9 up to 1.0 x U_s and with reduced rated current I_e/AC1 according to I_e/AC3

*2 Data on request

Micro Contactor MA Series

Data according to IEC 60947-5-1, VDE 0660, EN 60947-5-1

Auxilliary Contacts		Type	**MA04-S.. MA05-S..**
Rated insulation voltage	**U_i**	VAC	440*1
Thermal rated current I_{th} bis 440V			
Ambient temperature	40°C	A	5
	60°C	A	3
Power loss per pole	I_{th}	W	0.25
Utilization category AC15			
Rated operational current I_e	220-240V	A	3
	380-415V	A	1.5
	440V	A	1
Utilization category DC13			
Rated operational current I_e	60V	A	0.5
			-
			-
Maximum ambient temperature			
Operation	open	°C	-40 bis to +60 (+90)*2
	enclosed	°C	-40 bis to +40
Storage		°C	-40 bis to +90
Short circuit protection			
short circuit current 1kA, contact welding not accepted max fuse size	gL (gG)	A	10
For contactors with thermal overload relay the device with the smaller admissible control fuse (contactor or thermal overload relay) determines the fuse size			
Power consumption of coils			
AC operated	inrush	VA	9
	sealed	VA	4
		W	1.8
Operation range of coils			
in multiples of control voltage U_s			0.85 - 1.1
Switching time at control voltage U_s ±10%*3*4			
AC operated	make time	ms	13 - 18
	release time	ms	5 - 10
	arc duration	ms	10 - 15
DC operated	make time	ms	-
	release time	ms	-
	arc duration	ms	-
Cable cross-section			
all connectors	solid	mm^2	05 - 1.5
	flexible	mm^2	0.5 - 1.5
	flexible with multicore cable end	mm^2	0.5 - 1.5
Clamps per pole			2
	solid or stranded	AWG	20 - 14

*1 Suitable at 690V for: earthed-neutral systems, overvoltage category I to III, polution degree 3 (standard-industry): Uimp = 4kV
Data for other conditions on request

*2 With reduced control voltage range 0.9 up to 1.0 x U_s and with reduced thermal rated current I_{th} to I_e/AC15

*3 Summary switching time = release time + arc duration

*4 Release time of NC make time of NO increase when suppressor units for voltage peak protection are used (Varistor, RC-units, Diode units)

*5 Data on request

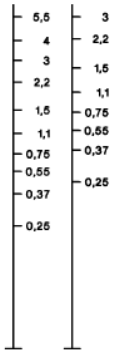
Micro Contactor MA Series

For North America - Data according UL508

Main Contacts (cULus)		Type	**MA05-S.. MA05-R-S..**	**MA04-S..**
Rated operational current “General Use”		A	12	5
Rated operational power of three motors	110-120V	hp	½	-
at 60Hz (3ph)	200-208V	hp	1	-
	220-240V	hp	1	-
	277V	hp	1½	
Rated operational power of AC motors	110-120V	hp	⅛	-
at 60Hz (1ph)	200-208V	hp	½	-
	220-240V	hp	¾	
Fuse / Short circuit current		A/kA	30/5	-
Rated voltage		VAC	300	300
Auxilliary contacts (cULus)	heavy pilot duty	AC	B300	B300
	Standard pilot duty	DC	R300	R300

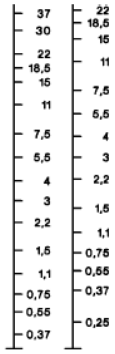
Motor Rating
P_n=AC4

380/ 220/
400V 230V
kW kW



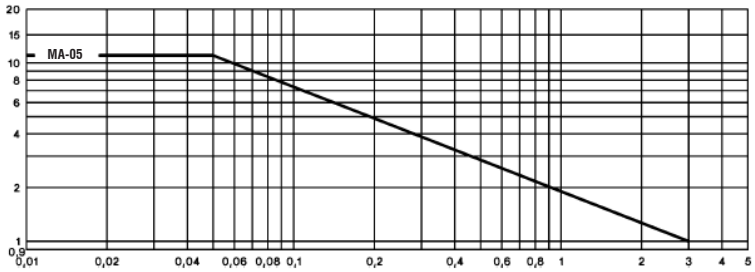
Motor Rating
P_n=AC3

380/ 220/
400V 230V
kW kW



Breaking Current
I_a($=I_e$=AC1)

A



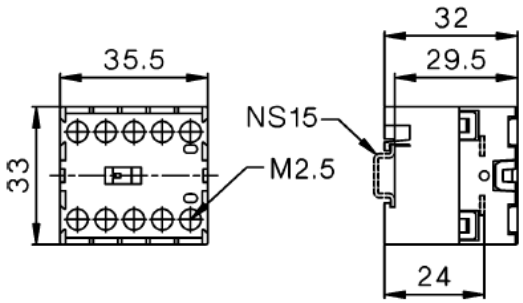
Millions of Operations

Micro Contactor MA Series

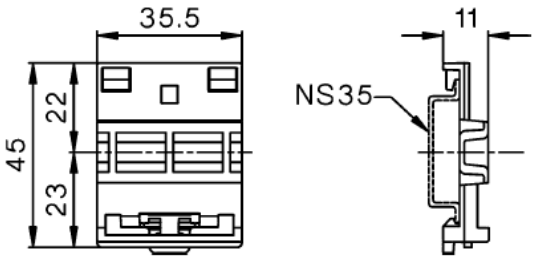
Dimensions

AC Operated
with screw terminals

MA04-S..
MA05-S..

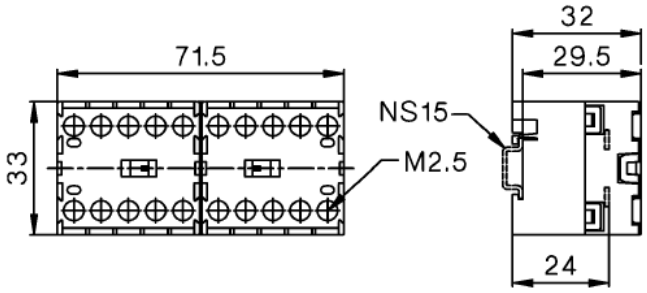


Snap-On Adaptor MA-P1039

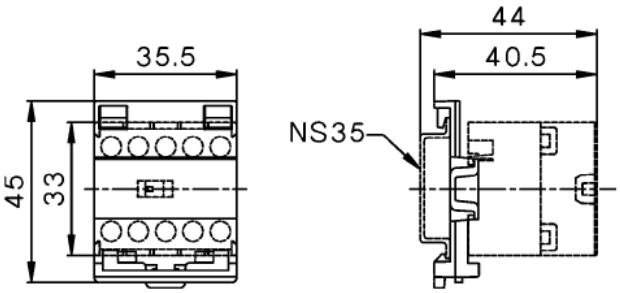


Reversing Contactors
with screw terminals

MA05-R-S..

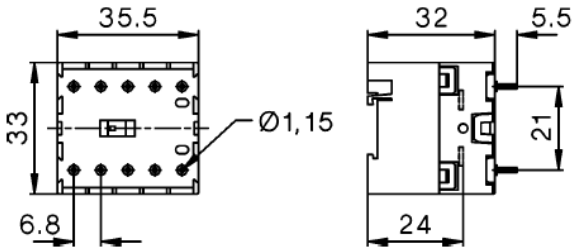


MA..-S.. with Snap-On Adaptor MA-P1039



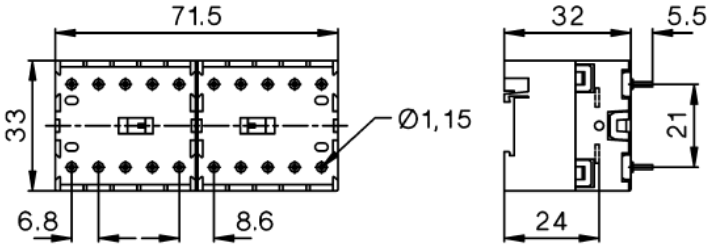
AC Operated
with solder connections

MA04-P..
MA05-P..



Reversing Contactors
with solder connections

MA05-R-S..



Mounting positions of contactors

MA