

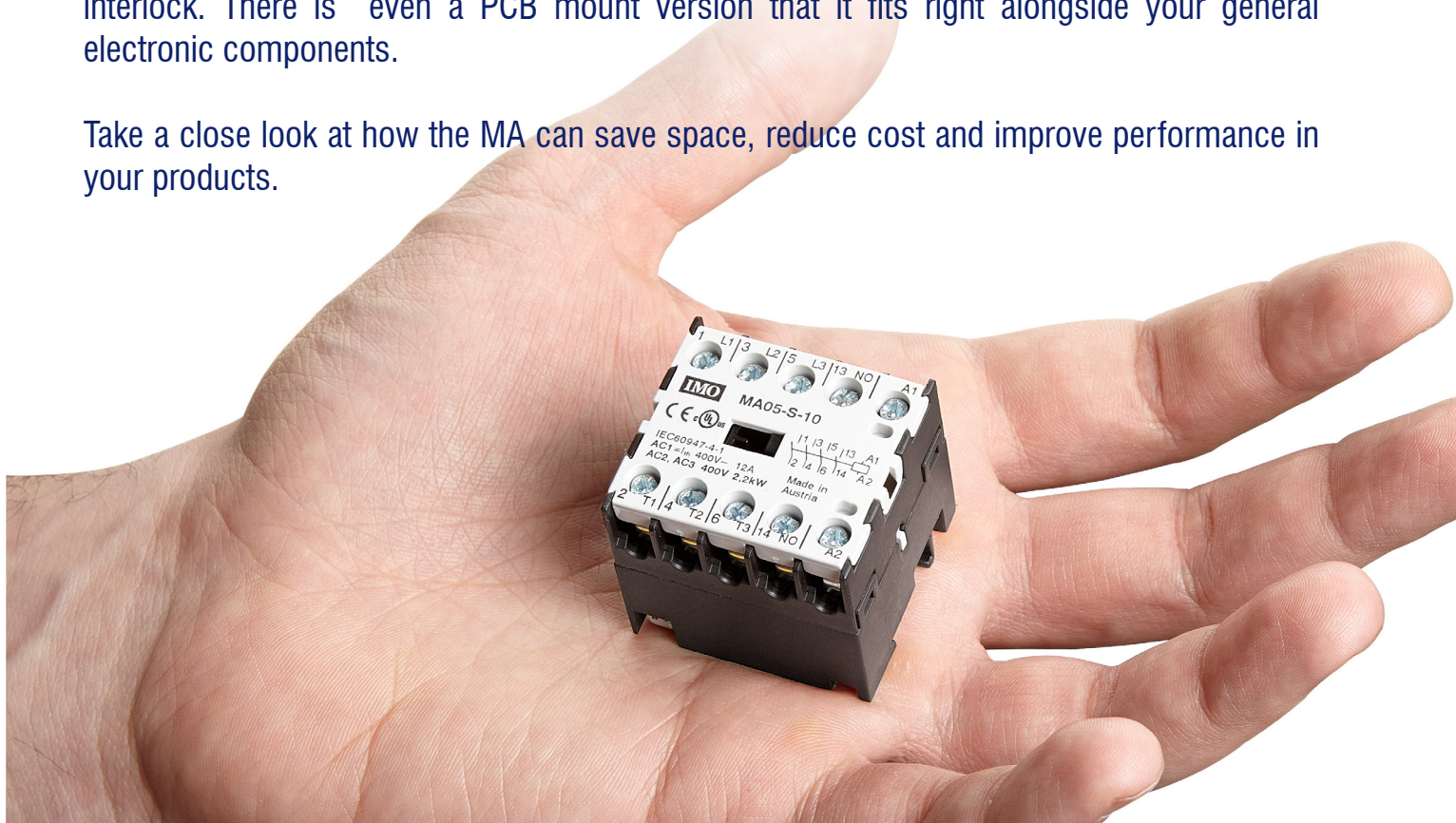
Is this the smallest reversing contactor in the world?



Developed specifically for chain-hoist applications, the IMO “MA Series” of and approved micro-contactor is surely the neatest and most cost-effective solution for your motor switching requirements.

With >3mm contact clearance (in accordance with IEC 60335-1 Safety Standard) and with 5A AC3 @ 400VAC and 12A AC1 @ 400VAC ratings, the MA Series is suitable for most chain hoist motor switching applications including reversing contactor with mechanical interlock. There is even a PCB mount version that it fits right alongside your general electronic components.

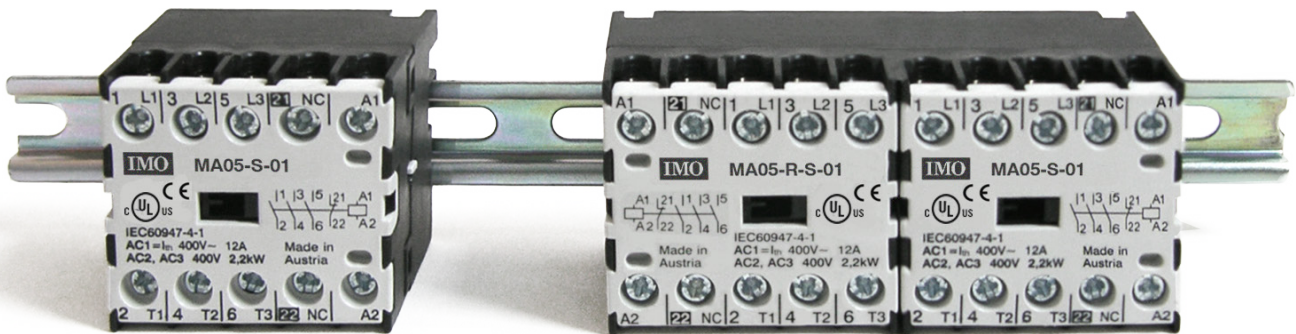
Take a close look at how the MA can save space, reduce cost and improve performance in your products.



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 Relays

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Micro Contactors

Page 3



Micro Contactors With Solder Pins
Coil Voltages

Page 4



Micro Reversing Contactor

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Technical Data

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Micro Contactor MA Series



Micro Contactor Relays 4-Pole

AC Operated

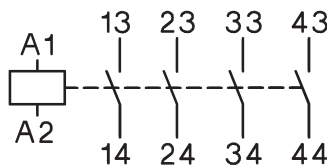
Ratings Therm.	Contacts *2	Distinc. Number	Additional Contact	Type	Coil Voltage *1	Pack pcs.	Weight kg/pc.
AC15	Rated-Current				24 24V 50/60Hz		
230V A	400V A	I_{th} A	NO NC	acc. to EN50011	230 220-240V 50/60Hz		
				Blocks Type	↓		

4-Pole, With Screw Terminals

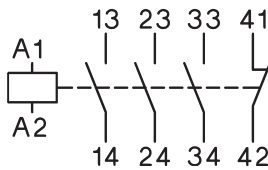


3	1.5	5	4	-	40E	-	MA04-S-40	...	10	0.07
3	1.5	5	3	1	31E	-	MA04-S-31	...	10	0.07
3	1.5	5	2	2	22E	-	MA04-S-22	...	10	0.07

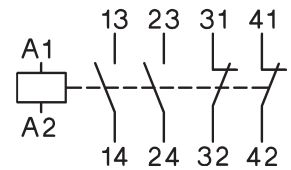
MA04-S-40



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	Rated Current	Aux. Contacts*2	Type	Coil Voltage *1
AC2, AC3	AC1	Built-in Additional		
				24 24V 50/60Hz
				230 220-240V 50/60Hz

380V 400V 415V kW	660V 690V kW	440V A	NO	NC	Type	↓	Pack pcs.	Weight kg/pc.
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3-Pole, With Screw Terminals

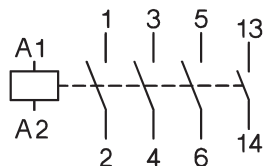


2.2	-	12	1	-	-	MA05-S-10	...	10	0.07
2.2	-	12	-	1	-	MA05-S-01	...	10	0.07

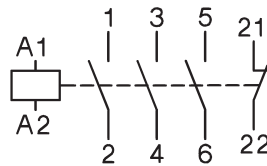
4-Pole, With Screw Terminals

2.2	-	12	-	-	-	MA05-S-0040	...	10	0.07
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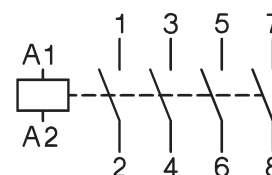
MA05-S-10



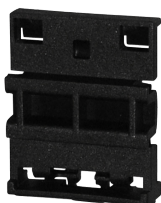
MA05-S-01



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	Rated Current	Aux. Contacts*2		Type	Coil Voltage *1	
		Built-in	Additional		24	230
AC2, AC3	AC1				24V 50/60Hz	220-240V 50/60Hz

380V 400V 415V kW	660V 690V kW	440V A	NO	NC	Type	↓	Pack pcs.	Weight kg/pc.
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3-Pole, With Solder Pins Ø1.15 For Printed Circuit Applications

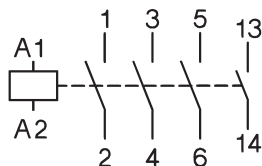


2.2	-	9	1	-	-	MA05-P-10	...	10	0.07
2.2	-	9	-	1	-	MA05-P-01	...	10	0.07

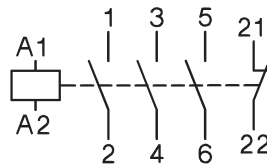
4-Pole, With Solder Pins Ø1.15 for Printed Circuit Applications

2.2	-	9	-	-	-	MA05-P-0040	...	10	0.07
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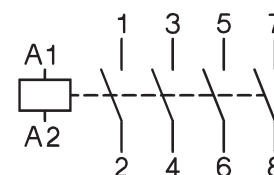
MA05-P-10



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		Rated Control Voltage U _s range			
	for 50Hz	for 60Hz	for 50Hz		for 60Hz	
	V	V	min.	max.	min.	max.
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		Rated Control Voltage U _s range			
	for 50Hz	for 60Hz	for 50Hz		for 60Hz	
	V	V	min.	max.	min.	max.
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	Rated Current	Aux. Contacts*2		Type	Coil Voltage *1	Pack pcs.	Weight kg/pc.
		Built-in	Additional on the left hand side contactor				
AC2, AC3	AC1				24 230		
380V 400V 415V kW	660V 690V kW	440V A	 NO	 NC			
				K1 Type	K2 Type		

3-Pole, With Screw Terminals

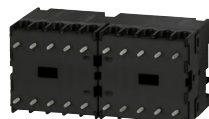


2.2	-	12	-	1	-	-	MA05-R-S-01	...	1	0.14
2.2	-	12	1	-	-	-	MA05-R-S-10	...	1	0.14

4-Pole, With Screw Terminals

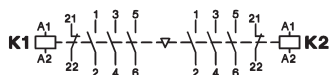
2.2	-	12	-	-	-	-	MA05-R-S-0040	...	1	0.14
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3-Pole, With Solder Pins Ø1.15 For Printed Circuit Applications

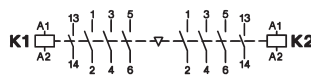


2.2	-	xxx*3	-	1	-	-	MA05-R-P-01	...	1	0.14
2.2	-	xxx*3	1	-	-	-	MA05-R-P-10	...	1	0.14

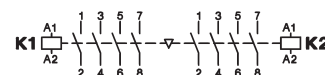
MA05-R-S-01



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..
Rated insulation voltage U_i	V AC	480*1
Making capacity I_{eff} at $U_e = 440V$ AC	A	65
Breaking capacity I_{eff} $\cos\varphi = 0.65$ 400V AC	A	50
Utilization category AC1		
Switching of resistive load		
Rated operational current $I_e (=I_{th})$ at 40°C, open	A	12
Rated operational power of three-phase resistive loads 50-60Hz, $\cos\varphi = 1$	230V kW	4.7
	240V kW	4.8
	400V kW	8.3
	415V kW	8.6
	480V kW	9.5
Rated operational current $I_e (=I_{th})$ at 60°C, enclosed	A	8
Rated operational power of three-phase resistive loads 50-60Hz, $\cos\varphi = 1$	230V kW	3.1
	240V kW	3.3
	400V kW	5.5
	415V kW	5.7
	480V kW	6.5
Minimum cross-section of conductor at load with $I_e (=I_{th})$	mm ²	1.5
Utilization category AC2 and AC3		
Switching of three-phase motors		
Rated operational current I_e open and enclosed	220V A	6.2
	230V A	6.2
	240V A	5.6
	380-400V A	5
	415-440V A	5
	480V A	5
Rated operational power of three-phase motors 50-60Hz	220-240V kW	1.5
	380-440V kW	2.2
	480V kW	2.2
Utilization category AC4		
Switching of squirrel cage motors, inching		
Rated operational current I_e open and enclosed	220V A	4.9
	230V A	4.9
	240V A	4.1
	380-400V A	3.5
	415-440V A	3.5
	480V A	3.5
Rated operational power of three-phase motors 50-60Hz	220-240V kW	1.1
	380-440V kW	1.5
	480V kW	1.5

*1 Suitable at 690V for: earthed-neutral systems, overvoltage category I to III, pollution degree 3 (standard-industry): $U_{imp} = 4kV$.
Data for other conditions on request

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 _o	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
Time constant L/R ≤ 15ms	60V	A	-
Rated operational current I _o	110V	A	-
	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 max. fuse size	gL (gG)	A	20
Coordination-type "2" according to IEC 947-4-1			
Light contact welding accepted max. fuse size	gL (gG)	A	-
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			
contactors without thermal overload relay			
	without load	1/h	10000
	AC3 I _o	1/h	600
	AC4 I _o	1/h	120
	DC3 I _o	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 _o /AC3 400V	W	0.2
Resistance to shock according to IEC 68-2-27			
Shock 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_o and with reduced rated current I_o/AC1 according to I_o/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 $U_s \pm 10\%$ *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, pollution degree 3 (standard-industry): $U_{imp} = 4kV$
Data for other conditions on request

*2 With reduced control voltage range 0.9 up to $1.0 \times U_s$ 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 phase motors at 60Hz (3ph)	110-120V hp	1/2	-
	200-208V hp	1	-
	220-240V hp	1	-
	277V hp	1 1/2	-
Rated operational power of AC motors at 60Hz (1ph)	110-120V hp	1/6	-
	200-208V hp	1/2	-
	220-240V hp	3/4	-
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

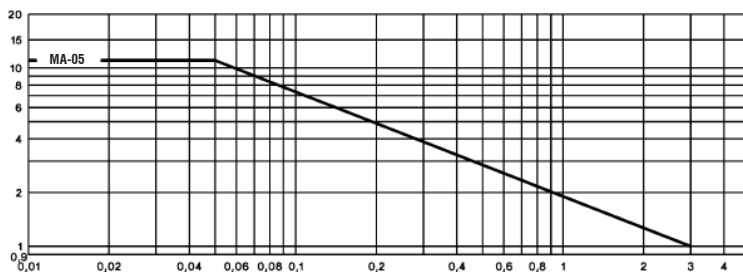
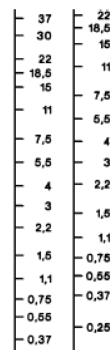
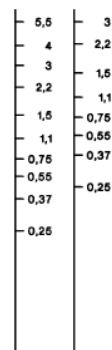
380/ 220/
400V 230V
kW kW

Motor Rating
P_n = AC3

380/ 220/
400V 230V
kW kW

Breaking Current
I_a (= I_e = AC1)

A



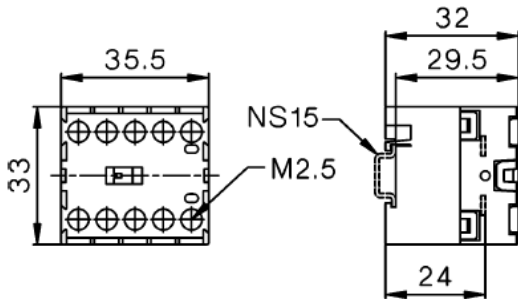
Millions of Operations

Micro Contactor MA Series

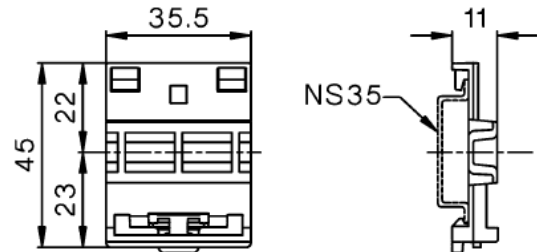
Dimensions

AC Operated
with screw terminals

MA04-S..
MA05-S..

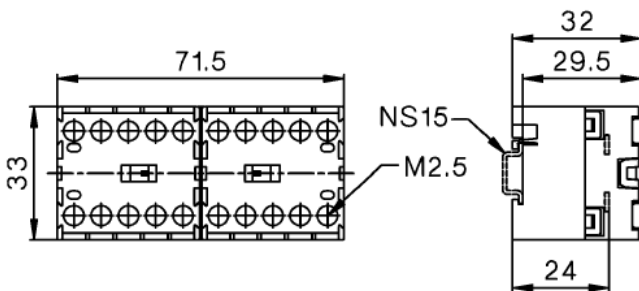


Snap-On Adaptor MA-P1039

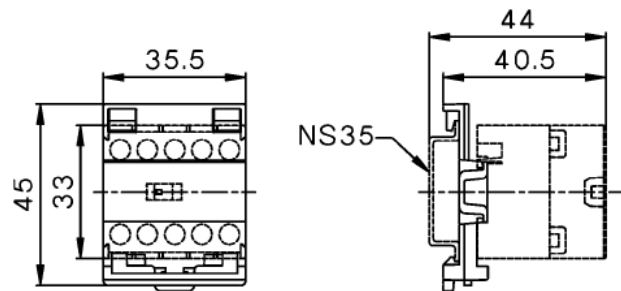


Reversing Contactors
with screw terminals

MA05-R-S..

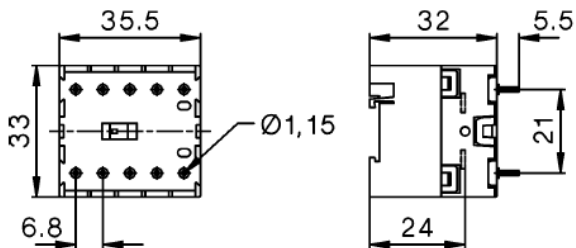


MA..-S.. with Snap-On Adaptor MA-P1039



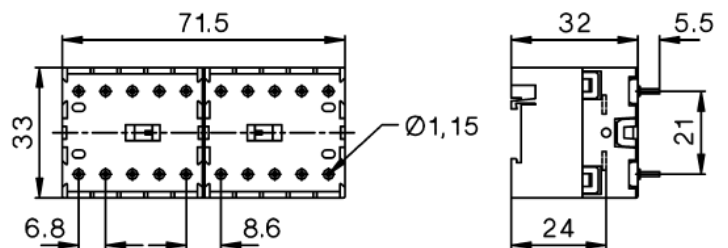
AC Operated
with solder connections

MA04-P.
MA05-P.



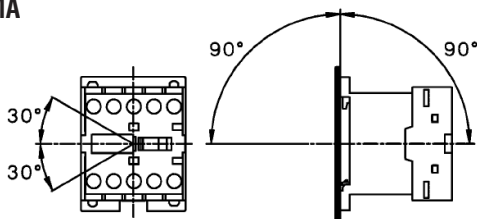
Reversing Contactors
with solder connections

MA05-R-S..



Mounting positions of contactors

MA



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IMO Automazione

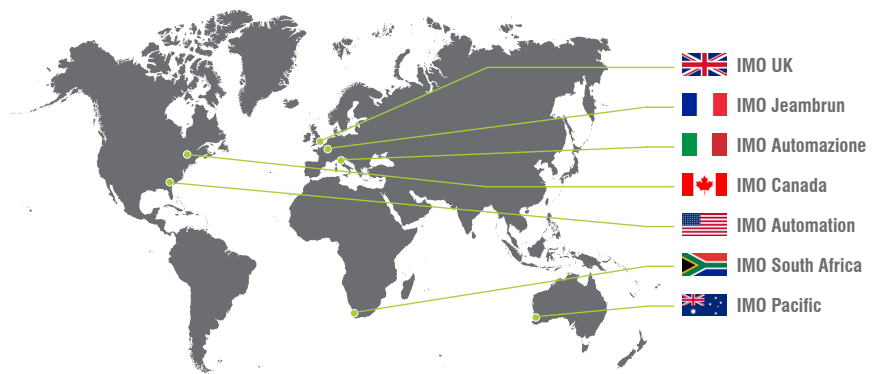
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