

Hermetically Contactor for extreme environment

4kW-30kW

5hp-50hp

www.EnergyToMotion.com

• INTRODUCTION

Hermetically MIL Series Contactors are designed by our team of engineers and produced in our laboratories with the most advanced techniques of manufacturing and testing, to meet particular design specifications that require the use of instruments able to work in extreme environments and in harsh conditions.

In particular, the contactors are designed and manufactured to meet the requirements of the following applications:

- ✓ military;
- ✓ naval;
- ✓ industrial;

and more

- ✓ in oil platform, naval and land
- ✓ in mining applications;
- ✓ in designing the cooling.

Stand out in particular for the following specifications:

- ✓ operating temperature range from -40 ° C to +80 ° C;
- ✓ storage temperature range, -60 ° C to +90 ° C;
- ✓ tolerable level of shock, up to 30 g;
- ✓ tolerable level of vibration, up to 300 Hz;
- ✓ reliability, 10 million cycles.

To have a significant contactors use cost reduction, they are designed and manufactured with the ability to:

- ✓ feed the coil in DC or AC 50/60 Hz;
- ✓ drive the coil directly from the PLC, thank to the low absorption and to the low current demand;
- ✓ eliminate any additional external circuit to contactor for overcurrent protection, because it already into the contactor.

They can drive voltages up to 690VAC and can be used for the control of three-phase motors, resistive or inductive loads.

Each contactor is individually tested to ensure the maximum reliability of the product provided.

All the three-phase configurations available are:

- ✓ single coil contactor, 1 input, 1 output (MIL, MIL-MINI e MIL-MICRO series);
- ✓ reversing phase contactor, double coil, 1 input, 1 output, -INV suffix (MIL e MIL-MICRO series);
- ✓ bypass contactor, double coil, 1 input, 2 outputs, -BYP suffix (MIL, MIL-MINI e MIL-MICRO series)
- ✓ triple coil contactor, 1 input, 2 outputs, star-delta starter, -STR suffix (MIL series).

On request it's possible to realize any INPUT-OUTPUT configuration. Is also possible add auxiliary contacts in any configuration: it is possible to create the Part Number using the following Table 1.

MIL series order code

IEC	UL/CSA	Coil Voltage		Auxiliary contacts		Order Code
Rated Power	3 phase	Vmin..Vmax				
400V - 3 phase	motor rating 480V					
kW	hp	Vac 50/60Hz	Vdc			
4	5		12..20	1	0	MIL-004-012-10
			12..20	0	1	MIL-004-012-01
		24..60	20..60	1	0	MIL-004-020-10
		24..60	20..60	0	1	MIL-004-020-01
		48..130	48..130	1	0	MIL-004-048-10
		48..130	48..130	0	1	MIL-004-048-01
		100..250	100..250	1	0	MIL-004-100-10
		100..250	100..250	0	1	MIL-004-100-01
5,5	7,5		12..20	1	0	MIL-055-012-10
			12..20	0	1	MIL-055-012-01
		24..60	20..60	1	0	MIL-055-020-10
		24..60	20..60	0	1	MIL-055-020-01
		48..130	48..130	1	0	MIL-055-048-10
		48..130	48..130	0	1	MIL-055-048-01
		100..250	100..250	1	0	MIL-055-100-10
		100..250	100..250	0	1	MIL-055-100-01
7,5	10		12..20	1	0	MIL-075-012-10
			12..20	0	1	MIL-075-012-01
		24..60	20..60	1	0	MIL-075-020-10
		24..60	20..60	0	1	MIL-075-020-01
		48..130	48..130	1	0	MIL-075-048-10
		48..130	48..130	0	1	MIL-075-048-01
		100..250	100..250	1	0	MIL-075-100-10
		100..250	100..250	0	1	MIL-075-100-01
11	15		12..20	0	0	MIL-110-012-00*
		24..60	20..60	0	0	MIL-110-020-00*
		48..130	48..130	0	0	MIL-110-048-00*
		100..250	100..250	0	0	MIL-110-100-00*
15	20		12..20	0	0	MIL-150-012-00*
		24..60	20..60	0	0	MIL-150-020-00*
		48..130	48..130	0	0	MIL-150-048-00*
		100..250	100..250	0	0	MIL-150-100-00*
18,5	20		12..20	0	0	MIL-185-012-00*
		24..60	20..60	0	0	MIL-185-020-00*
		48..130	48..130	0	0	MIL-185-048-00*
		100..250	100..250	0	0	MIL-185-100-00*

Table 1

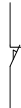
IEC Rated Power 400V - 3 phase kW	UL/CSA 3 phase motor rating 480V hp	Coil Voltage Vmin..Vmax		Auxilliary contacts		Order Code
		Vac 50/60Hz	Vdc			
22	40	24..60	20..60	1	0	MIL-220-020-10
		48..130	48..130	1	0	MIL-220-048-10
		100..250	100..250	1	0	MIL-220-100-10
		250..500	250..500	1	0	MIL-220-250-10
		24..60	20..60	0	1	MIL-220-020-01
		48..130	48..130	0	1	MIL-220-048-01
		100..250	100..250	0	1	MIL-220-100-01
		250..500	250..500	0	1	MIL-220-250-01
30	50	24..60	20..60	1	0	MIL-300-020-10
		48..130	48..130	1	0	MIL-300-048-10
		100..250	100..250	1	0	MIL-300-100-10
		250..500	250..500	1	0	MIL-300-250-10
		24..60	20..60	0	1	MIL-300-020-01
		48..130	48..130	0	1	MIL-300-048-01
		100..250	100..250	0	1	MIL-300-100-01
		250..500	250..500	0	1	MIL-300-250-01

Table 2

IEC	UL/CSA	Coil Voltage		Auxilliary contacts		Order Code
Rated Power 400V - 3 phase	3 phase motor rating 480V	Vmin..Vmax				
kW	hp	Vac 50/60Hz	Vdc			
4	5		12..20	2	0	MIL-004-012-10-INV
			12..20	0	2	MIL-004-012-01-INV
		24..60	20..60	2	0	MIL-004-020-10-INV
		24..60	20..60	0	2	MIL-004-020-01-INV
		48..130	48..130	2	0	MIL-004-048-10-INV
		48..130	48..130	0	2	MIL-004-048-01-INV
		100..250	100..250	2	0	MIL-004-100-10-INV
		100..250	100..250	0	2	MIL-004-100-01-INV
5,5	7,5		12..20	2	0	MIL-055-012-10-INV
			12..20	0	2	MIL-055-012-01-INV
		24..60	20..60	2	0	MIL-055-020-10-INV
		24..60	20..60	0	2	MIL-055-020-01-INV
		48..130	48..130	2	0	MIL-055-048-10-INV
		48..130	48..130	0	2	MIL-055-048-01-INV
		100..250	100..250	2	0	MIL-055-100-10-INV
		100..250	100..250	0	1	MIL-055-100-01-INV
7,5	10		12..20	2	0	MIL-075-012-10-INV
			12..20	0	2	MIL-075-012-01-INV
		24..60	20..60	2	0	MIL-075-020-10-INV
		24..60	20..60	0	2	MIL-075-020-01-INV
		48..130	48..130	2	0	MIL-075-048-10-INV
		48..130	48..130	0	2	MIL-075-048-01-INV
		100..250	100..250	2	0	MIL-075-100-10-INV
		100..250	100..250	0	2	MIL-075-100-01-INV
11	15		12..20	0	0	MIL-110-012-00*-INV
		24..60	20..60	0	0	MIL-110-020-00*-INV
		48..130	48..130	0	0	MIL-110-048-00*-INV
		100..250	100..250	0	0	MIL-110-100-00*-INV
15	20		12..20	0	0	MIL-150-012-00*-INV
		24..60	20..60	0	0	MIL-150-020-00*-INV
		48..130	48..130	0	0	MIL-150-048-00*-INV
		100..250	100..250	0	0	MIL-150-100-00*-INV
18,5	20		12..20	0	0	MIL-185-012-00*-INV
		24..60	20..60	0	0	MIL-185-020-00*-INV
		48..130	48..130	0	0	MIL-185-048-00*-INV
		100..250	100..250	0	0	MIL-185-100-00*-INV

Table 3

IEC	UL/CSA	Coil Voltage		Auxilliary contacts		Order Code
Rated Power 400V - 3 phase kW	3 phase motor rating 480V hp	Vmin..Vmax Vac 50/60Hz	Vdc			
4	5		12..20	3	0	MIL-004-012-10-STR
			12..20	0	3	MIL-004-012-01-STR
		24..60	20..60	3	0	MIL-004-020-10-STR
		24..60	20..60	0	2	MIL-004-020-01-STR
		48..130	48..130	3	0	MIL-004-048-10-STR
		48..130	48..130	0	3	MIL-004-048-01-STR
		100..250	100..250	3	0	MIL-004-100-10-STR
		100..250	100..250	0	3	MIL-004-100-01-STR
5,5	7,5		12..20	3	0	MIL-055-012-10-STR
			12..20	0	3	MIL-055-012-01-STR
		24..60	20..60	3	0	MIL-055-020-10-STR
		24..60	20..60	0	3	MIL-055-020-01-STR
		48..130	48..130	3	0	MIL-055-048-10-STR
		48..130	48..130	0	3	MIL-055-048-01-STR
		100..250	100..250	3	0	MIL-055-100-10-STR
		100..250	100..250	0	3	MIL-055-100-01-STR
7,5	10		12..20	3	0	MIL-075-012-10-STR
			12..20	0	3	MIL-075-012-01-STR
		24..60	20..60	3	0	MIL-075-020-10-STR
		24..60	20..60	0	3	MIL-075-020-01-STR
		48..130	48..130	3	0	MIL-075-048-10-STR
		48..130	48..130	0	3	MIL-075-048-01-STR
		100..250	100..250	3	0	MIL-075-100-10-STR
		100..250	100..250	0	3	MIL-075-100-01-STR
11	15		12..20	0	0	MIL-110-012-00*-STR
		24..60	20..60	0	0	MIL-110-020-00*-STR
		48..130	48..130	0	0	MIL-110-048-00*-STR
		100..250	100..250	0	0	MIL-110-100-00*-STR
15	20		12..20	0	0	MIL-150-012-00*-STR
		24..60	20..60	0	0	MIL-150-020-00*-STR
		48..130	48..130	0	0	MIL-150-048-00*-STR
		100..250	100..250	0	0	MIL-150-100-00*-STR
18,5	20		12..20	0	0	MIL-185-012-00*-STR
		24..60	20..60	0	0	MIL-185-020-00*-STR
		48..130	48..130	0	0	MIL-185-048-00*-STR
		100..250	100..250	0	0	MIL-185-100-00*-STR

Table 4

IEC	UL/CSA	Coil Voltage		Auxilliary contacts		Order Code
Rated Power 400V - 3 phase	3 phase motor rating 480V	Vmin..Vmax				
kW	hp	Vac 50/60Hz	Vdc			
4	5		12..20	2	0	MIL-004-012-10-BYP
			12..20	0	2	MIL-004-012-01-BYP
		24..60	20..60	2	0	MIL-004-020-10-BYP
		24..60	20..60	0	2	MIL-004-020-01-BYP
		48..130	48..130	2	0	MIL-004-048-10-BYP
		48..130	48..130	0	2	MIL-004-048-01-BYP
		100..250	100..250	2	0	MIL-004-100-10-BYP
		100..250	100..250	0	2	MIL-004-100-01-BYP
5,5	7,5		12..20	2	0	MIL-055-012-10-BYP
			12..20	0	2	MIL-055-012-01-BYP
		24..60	20..60	2	0	MIL-055-020-10-BYP
		24..60	20..60	0	2	MIL-055-020-01-BYP
		48..130	48..130	2	0	MIL-055-048-10-BYP
		48..130	48..130	0	2	MIL-055-048-01-BYP
		100..250	100..250	2	0	MIL-055-100-10-BYP
		100..250	100..250	0	1	MIL-055-100-01-BYP
7,5	10		12..20	2	0	MIL-075-012-10-BYP
			12..20	0	2	MIL-075-012-01-BYP
		24..60	20..60	2	0	MIL-075-020-10-BYP
		24..60	20..60	0	2	MIL-075-020-01-BYP
		48..130	48..130	2	0	MIL-075-048-10-BYP
		48..130	48..130	0	2	MIL-075-048-01-BYP
		100..250	100..250	2	0	MIL-075-100-10-BYP
		100..250	100..250	0	2	MIL-075-100-01-BYP
11	15		12..20	0	0	MIL-110-012-00*-BYP
		24..60	20..60	0	0	MIL-110-020-00*-BYP
		48..130	48..130	0	0	MIL-110-048-00*-BYP
		100..250	100..250	0	0	MIL-110-100-00*-BYP
15	20		12..20	0	0	MIL-150-012-00*-BYP
		24..60	20..60	0	0	MIL-150-020-00*-BYP
		48..130	48..130	0	0	MIL-150-048-00*-BYP
		100..250	100..250	0	0	MIL-150-100-00*-BYP
18,5	20		12..20	0	0	MIL-185-012-00*-BYP
		24..60	20..60	0	0	MIL-185-020-00*-BYP
		48..130	48..130	0	0	MIL-185-048-00*-BYP
		100..250	100..250	0	0	MIL-185-100-00*-BYP

Table 5

MIL-MINI series order code

IEC	UL/CSA	Coil Voltage		Auxilliary contacts		Order Code
Rated Power 400V - 3 phase kW	3 phase motor rating 480V hp	Vmin..Vmax Vac 50/60Hz	Vdc			
4	5	20-30	1	0		MIL-MINI-004-024-10
		20-30	0	1		MIL-MINI-004-024-01
		40-50	1	0		MIL-MINI-004-048-10
		40-50	0	1		MIL-MINI-004-048-01
		90-130	1	0		MIL-MINI-004-110-10
		90-130	0	1		MIL-MINI-004-110-01
		180-250	1	0		MIL-MINI-004-230-10
		180-250	0	1		MIL-MINI-004-230-01
4	5	24	1	0		MIL-MINI-004-024AC-10
		24	0	1		MIL-MINI-004-024AC-01
		230	1	0		MIL-MINI-004-230AC-10
		230	0	1		MIL-MINI-004-230AC-01
		400	1	0		MIL-MINI-004-400AC-10
		400	0	1		MIL-MINI-004-400AC-01
5,5	7,5	20-30	1	0		MIL-MINI-055-024-10
		20-30	0	1		MIL-MINI-055-024-01
		40-50	1	0		MIL-MINI-055-048-10
		40-50	0	1		MIL-MINI-055-048-01
		90-130	1	0		MIL-MINI-055-110-10
		90-130	0	1		MIL-MINI-055-110-01
		180-250	1	0		MIL-MINI-055-230-10
		180-250	0	1		MIL-MINI-055-230-01
5,5	7,5	24	1	0		MIL-MINI-055-024AC-10
		24	0	1		MIL-MINI-055-024AC-01
		48	1	0		MIL-MINI-055-048AC-10
		48	0	1		MIL-MINI-055-048AC-01
		230	1	0		MIL-MINI-055-230AC-10
		230	0	1		MIL-MINI-055-230AC-01
7,5	10	20-30	1	0		MIL-MINI-075-024-10
		20-30	0	1		MIL-MINI-075-024-01
		40-50	1	0		MIL-MINI-075-048-10
		40-50	0	1		MIL-MINI-075-048-01
		90-130	1	0		MIL-MINI-075-110-10
		90-130	0	1		MIL-MINI-075-110-01
		180-250	1	0		MIL-MINI-075-230-10

IEC	UL/CSA	Coil Voltage	Auxilliary contacts		Order Code
Rated Power 400V - 3 phase	3 phase motor rating 480V	Vmin..Vmax			
		180-250	0	1	MIL-MINI-075-230-01
kW	hp	Vac 50/60Hz	Vdc		
7,5	10	24	1	0	MIL-MINI-075-024AC-10
		24	0	1	MIL-MINI-075-024AC-01
		48	1	0	MIL-MINI-075-048AC-10
		48	0	1	MIL-MINI-075-048AC-01
		230	1	0	MIL-MINI-075-230AC-10
		230	0	1	MIL-MINI-075-230AC-01

Table 6

• MIL-MICRO series order code

IEC	UL/CSA	Coil Voltage		Auxiliary contacts		Order Code
Rated Power 400V - 3 phase kW	3 phase motor rating 480V hp	Vmin..Vmax Vac 50/60Hz	Vdc			
4	5	22-30	1	0		MIL-MICRO-004-024DC-10
		22-30	0	1		MIL-MICRO-004-024DC-01
		110-127	1	0		MIL-MICRO-004-110DC-10
		110-127	0	1		MIL-MICRO-004-110DC-01
		220-240	1	0		MIL-MICRO-004-220DC-10
		220-240	0	1		MIL-MICRO-004-220DC-01
4	5	24	1	0		MIL-MICRO-004-024AC-10
		24	0	1		MIL-MICRO-004-024AC-01
		110-127	1	0		MIL-MICRO-004-110AC-10
		110-127	0	1		MIL-MICRO-004-110AC-01
		220-240	1	0		MIL-MICRO-004-220AC-10
		220-240	0	1		MIL-MICRO-004-220AC-01
5,5	7,5	22-30	1	0		MIL-MICRO-055-024DC-10
		22-30	0	1		MIL-MICRO-055-024DC-01
		110-127	1	0		MIL-MICRO-055-110DC-10
		110-127	0	1		MIL-MICRO-055-110DC-01
		220-240	1	0		MIL-MICRO-055-220DC-10
		220-240	0	1		MIL-MICRO-055-220DC-01
5,5	7,5	24	1	0		MIL-MICRO-055-024AC-10
		24	0	1		MIL-MICRO-055-024AC-01
		110-127	1	0		MIL-MICRO-055-110AC-10
		110-127	0	1		MIL-MICRO-055-110AC-01
		220-240	1	0		MIL-MICRO-055-220AC-10
		220-240	0	1		MIL-MICRO-055-220AC-01

Table 7

IEC	UL/CSA	Coil Voltage		Auxiliary contacts		Order Code
Rated Power 400V - 3 phase kW	3 phase motor rating 480V hp	Vmin..Vmax				
		Vac 50/60Hz	Vdc			
4	5	22-30		0	2	MIL-MICRO-004-024DC-01-INV
		110-127		0	2	MIL-MICRO-004-110DC-01-INV
		220-240		0	2	MIL-MICRO-004-220DC-01-INV
		24		0	2	MIL-MICRO-004-024AC-01-INV
		110-127		0	2	MIL-MICRO-004-110AC-01-INV
		220-240		0	2	MIL-MICRO-004-240AC-01-INV
5,5	7,5	22-30		0	2	MIL-MICRO-055-024DC-01-INV
		110-127		0	2	MIL-MICRO-055-048DC-01-INV
		220-240		0	2	MIL-MICRO-055-110DC-01-INV
		22-30		0	2	MIL-MICRO-055-024AC-01-INV
		110-127		0	2	MIL-MICRO-055-110AC-01-INV
		220-240		0	2	MIL-MICRO-055-220AC-01-INV
4	5	22-30		2	0	MIL-MICRO-004-024DC-10-INV
		110-127		2	0	MIL-MICRO-004-110DC-10-INV
		220-240		2	0	MIL-MICRO-004-220DC-10-INV
		24		2	0	MIL-MICRO-004-024AC-10-INV
		110-127		2	0	MIL-MICRO-004-110AC-10-INV
		220-240		2	0	MIL-MICRO-004-240AC-10-INV
5,5	7,5	22-30		2	0	MIL-MICRO-055-024DC-10-INV
		110-127		2	0	MIL-MICRO-055-110DC-10-INV
		220-240		2	0	MIL-MICRO-055-220DC-10-INV
		22-30		2	0	MIL-MICRO-055-024AC-10-INV
		110-127		2	0	MIL-MICRO-055-110AC-10-INV
		220-240		2	0	MIL-MICRO-055-220AC-10-INV

Table 8

Note

It is possible to ask for auxiliary contact. Write to info@energytomotion.com specifying the product P/N needed.

Product Part Number composition

MIL	- [power]	- [coil voltage]	- [Auxilliary contacts]	- [optional configuration]
	004=4kW 055=5,5kW 075=7,5kW 110=11kW 150=15kW 185=18,5kW 220=22kW 300=30kW	012=12..20Vdc 020=20..60Vdc / 24..60Vac 048=48..130Vdc/48..130Vac 100=100..250Vdc/100..250Vac	00=NO AUXILIARY CONTACT 10=  normally open 01=  normally close 11= N°2 auxiliary contacts (qty 1 normally open + q.ty 1 normally close) XY= auxiliary contacts (qty X normally open + q.ty Y normally close)	INV=REVERSING CONTACTOR STR=STAR TO DELTA CONFIGURATOR BYP=BYPASS CONFIGURATION

Table 1

MIL - MINI-	[power]	- [coil voltage]	- [Auxilliary contacts]
	004=4kW 055=5,5kW 075=7,5kW	024=20-30Vdc 048=40..50Vdc 110=90..130Vdc 230=180..250Vdc 024AC=24Vac +/-20% (50-60Hz) 230AC=230Vac +/-20% (50-60Hz) 400AC=400Vac +/-20% (50-60Hz)	00=NO AUXILIARY CONTACT 10=  normally open 01=  normally close

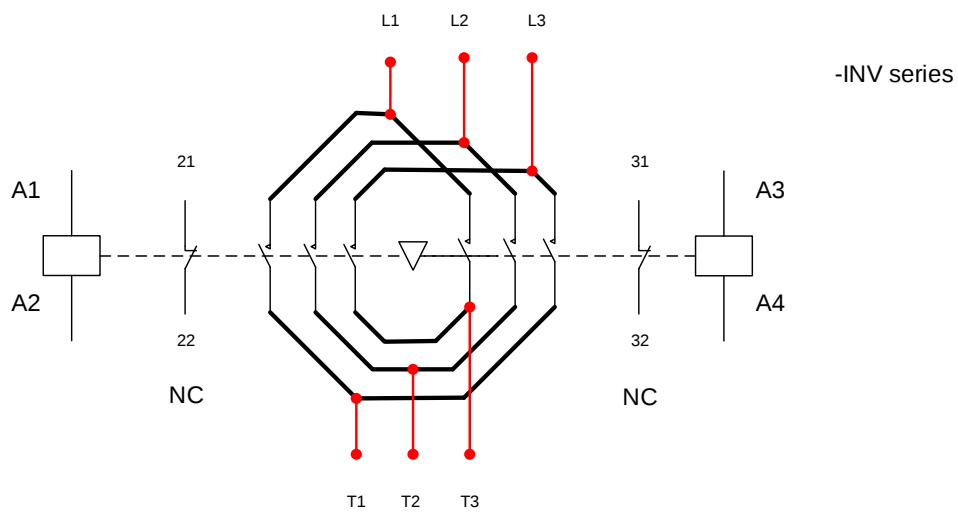
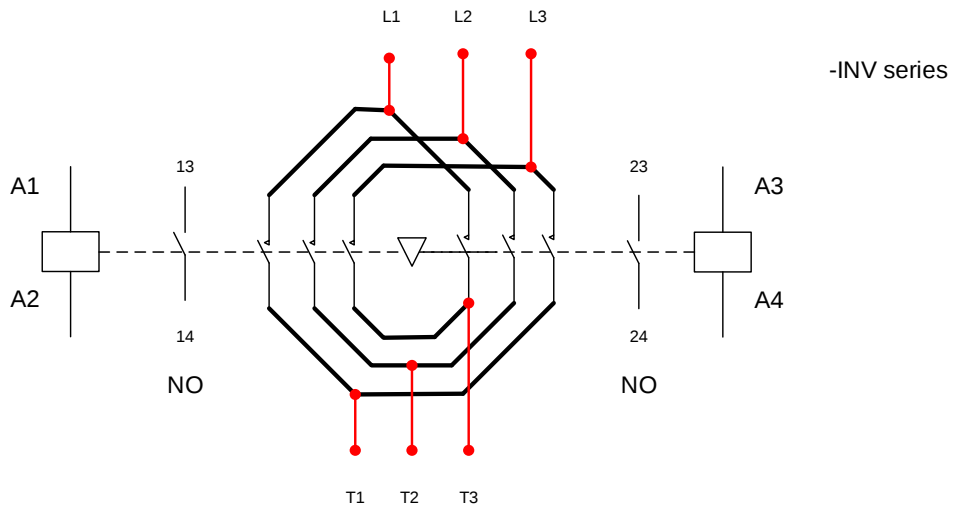
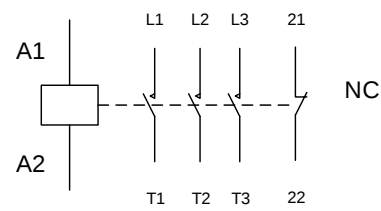
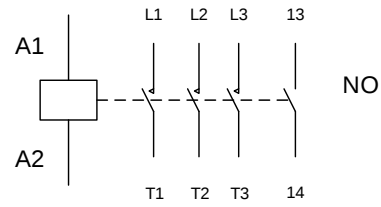
Table 10

MIL - MICRO -	[power]	- [coil voltage]	- [Auxilliary contacts]	- [Optional configuration]
	004=4kW 055=5,5kW	024DC 110DC 220DC 024AC(50-60Hz) 110AC(50-60Hz) 220AC(50-60Hz)	00=NO AUXILIARY CONTACT 10=  normally open 01=  normally close	INV=REVERSING CONTACTOR

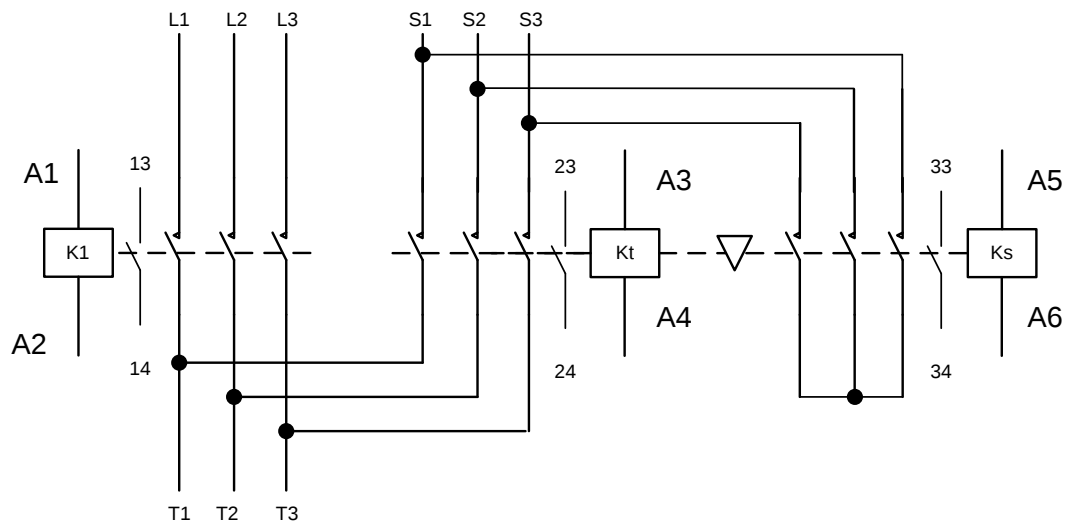
Table 11

Note: mechanical outlines of products are reported at the end of the datasheet and can be requested to info@energytomotion.com, specifying the product P/N.

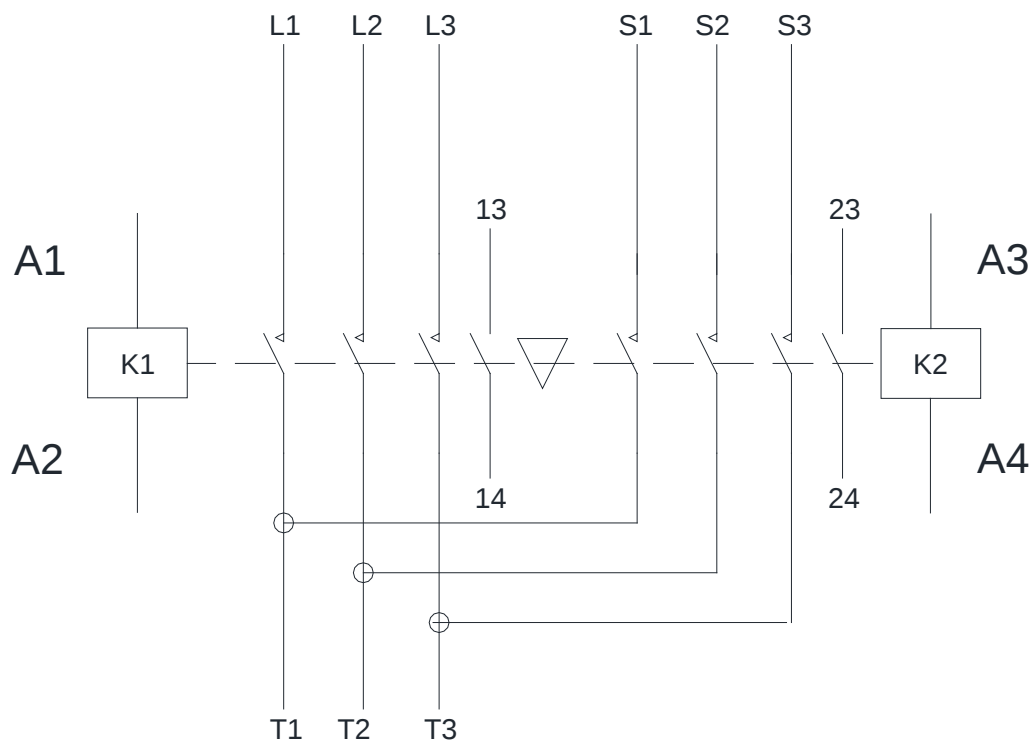
• Interconnection diagram



- STR series



- BYP series



• Technical characteristics

UTILIZATION CHARACTERISTIC ACCORDING TO IEC		Model MIL							
		MIL-004	MIL-055	MIL-075	MIL-110	MIL-150	MIL-185	MIL-220	MIL-300
Standard		IEC 60947-1 / 60947-4-1 and EN 60947-1 / 60947-4-1							
Rated operational voltage Ue max.		690V							
Rated frequency limits		25 ... 400 Hz							
Conventional free-air thermal current Ith									
acc. to IEC 60947-4-1, open contactors, $\theta \leq 40^\circ\text{C}$		35A	35A	35A	50A	50A	50A	105A	105A
with conductor cross-sectional area		4mm ²	6mm ²	6mm ²	10mm ²	10mm ²	10mm ²	35mm ²	35mm ²

UTILIZATION CHARACTERISTIC ACCORDING TO IEC		Model MIL-MINI / MIL-MICRO		
		MIL-MINI-004 MIL-MICRO-004	MIL-MINI-055 MIL-MICRO-055	MIL-MINI-075 --
Standard		IEC 60947-1 / 60947-4-1 and EN 60947-1 / 60947-4-1		
Rated operational voltage Ue max.		690V		
Rated frequency limits		25 ... 400 Hz		
Conventional free-air thermal current Ith				
acc. to IEC 60947-4-1, open contactors, $\theta \leq 40^\circ\text{C}$		20A	21A	22A
with conductor cross-sectional area		4 mm ²	4 mm ²	4 mm ²

SWITCHING ON RESISTIVE CIRCUITS			Model MIL-MINI / MIL-MICRO							
AC-1 Utilization category	Air Temp	Voltage	MIL-MINI-004 MIL-MICRO-004	MIL-MINI-055 MIL-MICRO-055	MIL-MINI-075 --					
IEC / AC-1 rated operational current	$\Theta \leq 40^\circ$	690V	20A	21A	22A					
	$\Theta \leq 60^\circ$	690V	15A	16A	16A					
	$\Theta \leq 70^\circ$	690V	12A	12A	13A					
	Conductor section area		4mm ²	4mm ²	4mm ²					

SWITCHING OF 3 PHASE CAGE MOTORS			Model MIL							
AC-3 Utilization category	Air Temp	Voltage	MIL-004	MIL-055	MIL-075	MIL-110	MIL-150	MIL-185	MIL-220	MIL-300
IEC / AC-3 reted operational CURRENT (1500 rpm 50Hz or 1900 rpm 60Hz)	$\Theta \leq 60^\circ$	220-230-240V	9A	12A	18A	26A	33A	40A	53A	65A
	$\Theta \leq 60^\circ$	380-400V	9A	12A	18A	26A	32A	38A	53A	65A
	$\Theta \leq 60^\circ$	415V	9A	12A	18A	26A	32A	38A	53A	65A
	$\Theta \leq 60^\circ$	440V	9A	12A	18A	26A	32A	38A	53A	65A
	$\Theta \leq 60^\circ$	500V	9.5A	12.5A	15A	23A	28A	33A	45A	55A
	$\Theta \leq 60^\circ$	690V	7A	9A	10.5A	17A	21A	24A	35A	39A
IEC / AC-3 reted operational POWER (1500 rpm 50Hz or 1900 rpm 60Hz)	$\Theta \leq 60^\circ$	220-230-240V	2.2kW	3 kW	4 kW	6.5 kW	9 kW	11 kW	15kW	18.5kW
	$\Theta \leq 60^\circ$	380-400V	4 kW	5.5kW	7.5 kW	11 kW	15 kW	18.5 kW	22kW	30kW
	$\Theta \leq 60^\circ$	415V	4 kW	5.5kW	9 kW	11 kW	15 kW	18.5 kW	30kW	37kW
	$\Theta \leq 60^\circ$	440V	4 kW	5.5kW	9 kW	15 kW	18.5 kW	22 kW	30kW	37kW
	$\Theta \leq 60^\circ$	500V	5.5 kW	7.5 kW	9 kW	15 kW	18.5 kW	22 kW	30kW	37kW
	$\Theta \leq 60^\circ$	690V	5.0 kW	7.5 kW	9 kW	15 kW	18.5 kW	22 kW	30kW	37kW
Rated making capacity AC-3			10 x I _e AC-3 acc. to IEC 60947-4-1							

SWITCHING OF 3 PHASE CAGE MOTORS			Model MIL							
AC-3 Utilization category	Air Temp	Voltage	MIL-004	MIL-055	MIL-075	MIL-110	MIL-150	MIL-185	MIL-220	MIL-300
Rated breaking capacity AC-3			8 x I _e AC-3 acc. to IEC 60947-4-1							
AC-8a Utilization category (without thermal overload relay - U _e 400 V - $\theta \leq 40^\circ\text{C}$)										
I _e / AC-8a rated operational current			12A	16A	22A	30A	40A	50A	70A	85A
AC-8a rated operational power			5.5kW	7.5kW	11kW	15kW	20kW	25kW	37kW	45kW
Short-circuit protection for contactors (without thermal O/L relay - Motor protection excluded U _e $\leq$ 500 V AC - gG type fuse)			25A	32A	32A	50A	63A	63A	125A	160A
Rated short-time withstand current I _{cw} at 40 °C ambient temperature, in free air from a cold state		1s	300A	300A	700A	700A	700A	700A	1000A	1000A
		10s	150A	150A	350A	350A	350A	350A	600A	600A
		30s	80A	80A	225A	225A	225A	225A	350A	350A
		1 min	60A	60A	150A	150A	150A	150A	250A	250A
		15 min	35A	35A	50A	50A	50A	50A	110A	110A
Maximum breaking capacity cos ϕ = 0.45		@400V	250A	250A	250A	500A	500A	500A	950A	950A
		@690	106A	106A	106A	200A	200A	200A	600A	600A
Max. electrical switching frequency		AC-1	600 cycles/h							
		AC-3	1200 cycles/h							
		AC-2; AC-4	300 cycles/h				150 cycles/h			
Heat dissipation per pole		I _e / AC-1	0.8W	1W	1.2W	1.8W	2.4W	2.4W	6,3W	7W
		I _e / AC-3	0.1W	0.2W	0.35W	0.6W	0.9W	1.3W	1,7W	2,7W

SWITCHING OF 3 PHASE CAGE MOTORS			Model MIL-MINI / MIL-MICRO		
AC-3 Utilization category	Air Temp	Voltage	MIL-MINI-004 MIL-MICRO-004	MIL-MINI-055 MIL-MICRO-055	MIL-MINI-075
IEC / AC-3 reted operational CURRENT (1500 rpm 50Hz or 1900 rpm 60Hz)	$\theta \leq 60^\circ$	220-230-240V	9A	12A	15A
	$\theta \leq 60^\circ$	400V	9A	12A	15A
	$\theta \leq 60^\circ$	415V	9A	12A	15A
	$\theta \leq 60^\circ$	440V	8.5 A	12A	14A
	$\theta \leq 60^\circ$	500V	8A	12A	13A
	$\theta \leq 60^\circ$	690V	4.5 A	6.5 A	9A
IEC / AC-3 reted operational POWER (1500 rpm 50Hz or 1900 rpm 60Hz)	$\theta \leq 60^\circ$	220-230-240V	2.2kW	3 kW	4 kW
	$\theta \leq 60^\circ$	380-400V	4 kW	5.5kW	7.5 kW
	$\theta \leq 60^\circ$	415V	4 kW	5.5kW	7.5 kW
	$\theta \leq 60^\circ$	440V	4 kW	5.5kW	7.5 kW
	$\theta \leq 60^\circ$	500V	4 kW	5.5kW	7.5 kW
	$\theta \leq 60^\circ$	690V	4 kW	5.5kW	7.5 kW
Rated making capacity AC-3			10 x I _e AC-3 acc. to IEC 60947-4-1		
Rated breaking capacity AC-3			8 x I _e AC-3 acc. to IEC 60947-4-1		
AC-8a Utilization category (without thermal overload relay - U _e 400 V - $\theta \leq 40^\circ\text{C}$)					
I _e / AC-8a rated operational current			12A	16A	22A
AC-8a rated operational power			5.5kW	7.5kW	11kW
Short-circuit protection for contactors (without thermal O/L relay - Motor protection excluded U _e ≤ 500 V AC - gG type fuse)			25A	25A	25A
Rated short-time withstand current I _{cw} at 40 °C ambient temperature, in free air from a cold state		1s	220A	230A	240A
		10s	100A	120A	125A
		30s	60A	70A	75A
		1 min	50A	50A	55A

SWITCHING OF 3 PHASE CAGE MOTORS			Model MIL-MINI / MIL-MICRO			
AC-3 Utilization category	Air Temp	Voltage	MIL-MINI-004 MIL-MICRO-004	MIL-MINI-055 MIL-MICRO-055	MIL-MINI-075	
		15 min	20A	20A	21A	
Maximum breaking capacity		@400V	150A	150A	150A	
cos ϕ = 0.45		@690	85A	85A	85A	
Max. electrical switching frequency		AC-1	600 cycles/h			
		AC-3	MINI: 1200 cycles/h - MICRO: 600 cycles/h			
		AC-2; AC-4	MINI: 300 cycles/h - MICRO: 120 cycles/h			
Heat dissipation per pole		Ie / AC-1	MINI:1W – MICRO:0.8W	MINI:1.1W – MICRO:0.8W	MINI:1.2W	
		Ie / AC-3	MINI:0.20W – MICRO:0.15W	MINI:0.35W – MICRO:0.25W	MINI:0.65W	

AUXILIARY CONTACTS ACCORDING TO IEC		Model
		ALL MODELS
Rated operational voltage Ue max.		690V
Conventional free air thermal current Ith - $\theta \leq 40^\circ\text{C}$		16A (10A MIL-MINI , MIL-MICRO)
Rated frequency limits		25 .. 400 Hz
Rated operational current Ie / AC-15 according to IEC 60947-5-1	24-127 V 50/60 Hz	6A
	220-240 V 50/60 Hz	4A
	400-440 V 50/60 Hz	3A
	500 V 50/60 Hz	2A
	690 V 50/60 Hz	2A
Making capacity AC-15		10 x Ie AC-15 acc. to IEC 60947-5-1
Breaking capacity AC-15		10 x Ie AC-15 acc. to IEC 60947-5-1
Rated operational current Ie / DC-13 according to IEC 60947-5-1	24Vdc	6A-144W
	48Vdc	2.8A-134W
	72Vdc	1A-72W
	110Vdc	0.55A-60W

AUXILIARY CONTACTS ACCORDING TO IEC		Model
		<i>ALL MODELS</i>
	125Vdc	0.55A-69W
	220Vdc	0.27A-60W
	250Vdc	0.27A-68W
	400Vdc	0.15A-60W
	500Vdc	0.13A-65W
	600Vdc	0.1A-60W
Short-circuit protection gG type fuse		10A
Rated short-time withstand current I _{cw}	for 0.1 s	140A
	for 1.0 s	100A
Minimum switching capacity with failure rate acc. to IEC 60947-5-4		12 V / 3 mA
		10 ⁻⁷
Non-overlapping time between N.O. and N.C. contacts		≥ 2 ms
Heat dissipation per pole at 6 A		0.1W
Max. electrical switching frequency	AC-15	1200 cycles/h (MIL-MICRO: 600 cycles/h)
	DC-13	900 cycles/h (MIL-MICRO: 300 cycles/h)

UTILIZATION CHARACTERISTIC ACCORDING TO UL/NEMA/CSA			Model MIL							
			MIL-004	MIL-055	MIL-075	MIL-110	MIL-150	MIL-185	MIL-220	MIL-300
Standard			UL 508, CSA C22.2 N°14							
Rated operational voltage Ue max.			600V							
NEMA size			0	0		1				
NEMA continuous amp rating		thermal current	9A	18A		27A				
NEMA maximum H.P. ratings 1-phase, 60 Hz		115Vac	1/3Hp	1Hp		2Hp				
		230Vac	1Hp	2Hp		3Hp				
NEMA maximum H.P. ratings 3-phase, 60 Hz		1-200Vac	1-1/2Hp	3Hp		7-1/2Hp				
		1-230Vac	1-1/2Hp	3Hp		7-1/2Hp				
		460Vac	2Hp	5Hp		10Hp				
		575Vac	2Hp	5Hp		10Hp				
UL General use rating	600Vac		25A	28A	30A	45A	50A	50A	80A	90A
	With conductor cross-sectional area		AWG10	AWG10	AWG10	AWG8	AWG8	AWG8	AWG4	AWG3
80 V DC - 1-pole			25A	28A	30A	45A	50A	50A	80A	90A
	With conductor cross-sectional area		AWG10	AWG10	AWG10	AWG8	AWG8	AWG8	AWG4	AWG3
UL maximum 1-phase motor rating	Amp-rating	120Vac	13.8A	16A	20A	24A	24A	24A	34A	56A
		240Vac	10A	12A	17A	17A	28A	28A	50A	68A
	Motor power	120Vac	3/4Hp	1Hp	1-1/2Hp	2Hp	2Hp	2Hp	3 Hp	5 Hp

UTILIZATION CHARACTERISTIC ACCORDING TO UL/NEMA/CSA				Model MIL						
			MIL-004	MIL-055	MIL-075	MIL-110	MIL-150	MIL-185	MIL-220	MIL-300
UL maximum 3-phase motor rating	Amp-rating	240Vac	1-1/2Hp	2Hp	3Hp	3Hp	5Hp	5Hp	10Hp	15Hp
		200-208Vac	7.8A	11A	17.5A	25.3A	32.2A	32.2A	48.3A	62.1A
		220-240Vac	6.8A	9.6A	15.2A	22A	28A	28A	54A	68A
		440-480Vac	7.6A	11A	14A	21A	27A	27A	52A	65A
		550-600Vac	9A	11A	17A	22A			52A	62A
	Motor power (for 1500 r.p.m., 50 Hz or 1800 r.p.m., 60 Hz 3-phase motors)	200-208Vac	2Hp	3Hp	5Hp	7.5Hp	10Hp	10Hp	15Hp	20Hp
		220-240Vac	2Hp	3Hp	5Hp	7.5Hp	10Hp	10Hp	20Hp	25Hp
		440-480Vac	5Hp	7.5Hp	10Hp	15Hp	20Hp	20Hp	40Hp	50Hp
		550-600Vac	7.5Hp	10Hp	15Hp	20Hp			50Hp	60Hp
		Short-circuit protection for contactors	Fuse rating		60A	60A	60A	150A	150A	150A
Max. electrical switching frequency	for general use		600 cycles/h							
	for motor use		1200 cycles/h							
Mechanical durability	Number of operating cycles		10 millions operating cycles							
	Max. switching frequency		3600 cycles/h							

UTILIZATION CHARACTERISTIC ACCORDING TO UL/NEMA/CSA

Model MIL-MINI / MIL-MICRO

		MIL-MINI-004 MIL-MINI-055 MIL-MICRO-004 MIL-MICRO-055 MIL-MINI-075		
Standard		UL 508, CSA C22.2 N°14		
Rated operational voltage Ue max.		690V		
NEMA size		0	0	0
NEMA continuous amp rating		thermal current	9A	9A
NEMA maximum H.P. ratings 1-phase, 60 Hz		115Vac	1/3Hp	1/3Hp
		230Vac	1Hp	1Hp
NEMA maximum H.P. ratings 3-phase, 60 Hz		200Vac	1-1/2Hp	1-1/2Hp
		230Vac	1-1/2Hp	1-1/2Hp
		460Vac	2Hp	2Hp
		575Vac	2Hp	2Hp
UL General use rating	600Vac	12A	12A	15A
	With conductor cross-sectional area	AWG12	AWG12	AWG12
	80 V DC - 1-pole	12A	12A	15A
	With conductor cross-sectional area	AWG12	AWG12	AWG12
UL maximum 1-phase motor rating	Amp-rating	120Vac	7A	9A
		240Vac	8A	10A
	Motor power	120Vac	1/3Hp	1/2Hp
		240Vac	1Hp	2Hp
UL maximum 3-phase motor rating	Amp-rating	200-208Vac	7.5A	7.5A
		220-240Vac	6.5A	9A
		440-480Vac	7.5A	11A
		550-600Vac	9A	11A
	Motor power	200-208Vac	2Hp	2Hp
		220-240Vac	2Hp	3Hp

(for 1500 r.p.m., 50 Hz or 1800 r.p.m., 60 Hz 3-phase motors)

UTILIZATION CHARACTERISTIC ACCORDING TO UL/NEMA/CSA		Model MIL-MINI / MIL-MICRO		
		MIL-MINI-004 MIL-MICRO-004	MIL-MINI-055 MIL-MICRO-055	MIL-MINI-075
Short-circuit protection for contactors		440-480Vac	5Hp	7.5Hp
		550-600Vac	5Hp	7Hp
	Fuse rating (MINI)		40A	45A
	Fuse rating (MICRO)		20A	22A
Max. electrical switching frequency	for general use		600 cycles/h	
	for motor use		MINI: 1200 cycles/h - MICRO: 600 cycles/h	
Mechanical durability	Number of operating cycles		MINI: 10 millions; MICRO(AC):5 millions; MICRO(DC): 15 millions	
	Max. switching frequency		MINI: 3600 cycles/h; MICRO: 1800 cycles/h	

AUXILIARY CONTACTS ACCORDING TO UL/CSA		Model
		ALL MODELS
Rated operational voltage Ue max.		600 V AC, 600 V DC
Pilot duty		A600, Q600
AC thermal rated current		10A
AC maximum volt-ampere making		7200VA
AC maximum volt-ampere breaking		720A
DC thermal rated current		2.5A
DC maximum volt-ampere making-breaking		69A

GENERAL TECHNICAL DATA		Model			
		ALL MODELS			
Rated insulation voltage Ui acc. to IEC 60947-4-1			690V		
Rated insulation voltage Ui acc. to acc. to UL / CSA			600V		
Rated impulse withstand voltage Uimp.			6kV		
Electromagnetic compatibility			Devices complying with IEC 60947-1 / EN 60947-1 - Environment A		
Ambient air temperature close to contactor	Operation		MIL & MIL-MINI: -40 ... +70°C MIL-MICRO: -40 ... +65°C MIL-MICRO: -40 ... +80°C with reduced rated current at Ie * 0.75		
	Storage		MIL & MIL-MINI: -60 ... +80°C MIL-MICRO: -40 ... +90°C		
	Climatic withstand		Category B according to IEC 60947-1 Annex Q		
	Operating altitude (without derating)		≤ 3000 m		
Mechanical durability	Number of operating cycles		MIL & MIL-MINI : 10 millions operating cycles MICRO(AC):5 millions; MICRO(DC): 15 millions		
	Max. switching frequency		MIL & MIL-MINI : 3600 cycles/h ; MICRO: 1800 cycles/h		
Shock withstand acc. IEC 60068-2-27 and EN 60068-2-27	Mounting position 1 close or open position	Shock direction	Model MIL	Model MIL-MINI	MIL-MICRO
	A	30 g 5ms	20 g 5ms	15 g (AC coil) 5ms 20 g (DC coil) 5ms	
	B	25 g (Closed) 5ms 20 g (Open) 5ms	20 g 5ms	15 g (AC coil) 5ms 20 g (DC coil) 5ms	
	C	25 g (Closed) 5ms 20 g (Open) 5ms	20 g 5ms	15 g (AC coil) 5ms 20 g (DC coil) 5ms	

Vibration withstand acc. to IEC 60068-2-6	D	30 g 5ms	25 g 5ms	15 g (AC coil) 5ms 20 g (DC coil) 5ms
	E	30 g 5ms	25 g 5ms	15 g (AC coil) 5ms 20 g (DC coil) 5ms
		5 ... 300 Hz		
		10g Closed position / 10g Open position	10g Closed position / 10g Open position	

MAGNET SYSTEM CHARACTERISTICS

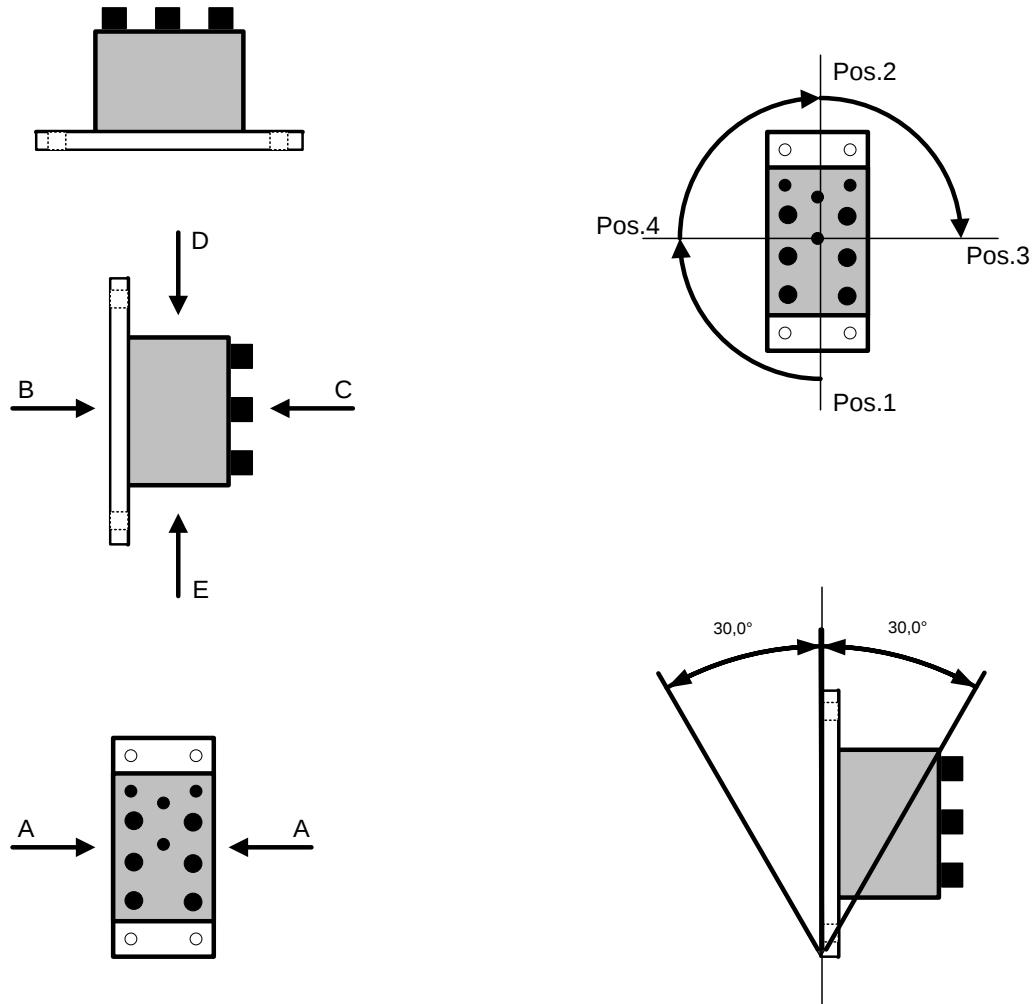
Model

ALL MODELS MIL

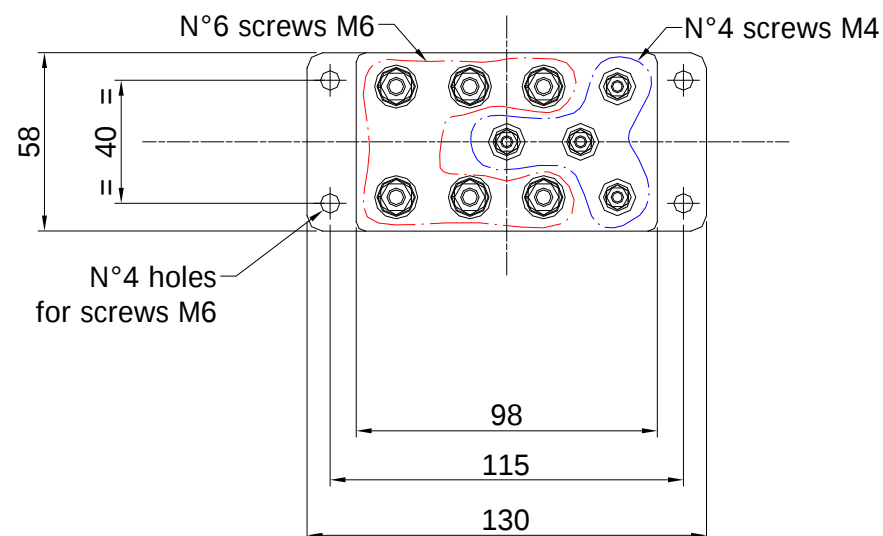
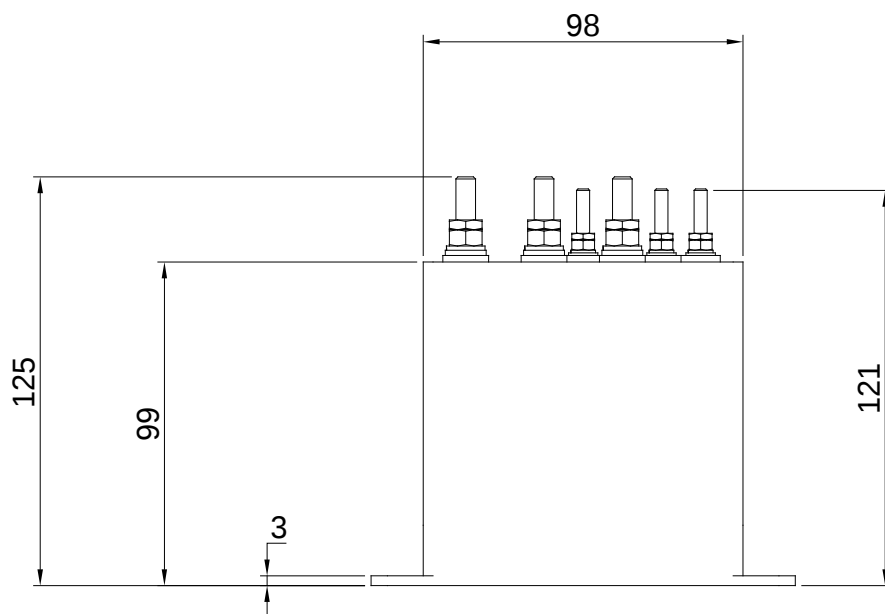
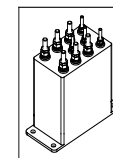
Coil operating limits acc. to IEC 60947-4-1	AC supply		at $\theta \leq 60^\circ\text{C}$ $0.85 \times U_c \text{ min} \dots 1.1 \times U_c \text{ max}$ at $\theta \leq 70^\circ\text{C}$ $0.85 \times U_c \text{ min} \dots U_c \text{ max}$
	DC supply		at $\theta \leq 60^\circ\text{C}$ $0.85 \times U_c \text{ min} \dots 1.1 \times U_c \text{ max}$ at $\theta \leq 70^\circ\text{C}$ $0.85 \times U_c \text{ min} \dots 1.1 \times U_c \text{ max}$
AC control voltage 50/60 Hz	Rated control circuit voltage U_c		24 ... 500 V AC
	Coil consumption	Average pull-in value	16 VA
		Average holding value	1.7 VA / 1.5 W
DC control voltage	Rated control circuit voltage U_c		12 ... 500 V DC
	Coil consumption	Average pull-in value	12 ... 16 W
		Average holding value	1.7 W
PLC-Output control			$\geq 500 \text{ mA}$ 24 V DC
Drop-out voltage in % of $U_c \text{ min}$.			$\leq 60 \% U_c \text{ min}$
Dips withstand (level 0% according to IEC 61000-4-11) $-20^\circ\text{C} \leq \theta \leq +60^\circ\text{C}$			22 ms average for $U_c = 24 \dots 250 \text{ V}$ 50/60Hz
Operating time	between coil energization and:	N.O. contact closing	40 ... 95 ms
		N.C. contact opening	38 ... 90 ms
	between coil de-energization and:	N.O. contact closing	11 ... 95 ms
		N.C. contact opening	13 ... 98 ms

MAGNET SYSTEM CHARACTERISTICS			Model	
MIL-MINI / MIL-MICRO				
Coil operating limits acc. to IEC 60947-4-1	AC supply		at $\theta \leq 60\text{ }^{\circ}\text{C}$ 0.85 x Uc min ... 1.1 x Uc max at $\theta \leq 70\text{ }^{\circ}\text{C}$ 0.85 x Uc min ... Uc max	
	DC supply		at $\theta \leq 60\text{ }^{\circ}\text{C}$ 0.85 x Uc min ... 1.1 x Uc max at $\theta \leq 70\text{ }^{\circ}\text{C}$ 0.85 x Uc min ... 1.1 x Uc max	
AC control voltage 50/60 Hz	Rated control circuit voltage Uc		24 ... 400 V AC	
	Coil consumption	Average pull-in value	35 VA	
		Average holding value	7 VA / 2W	
DC control voltage	Rated control circuit voltage Uc		12 ... 240 V DC	
	Coil consumption	Average pull-in value	3.5 W	
		Average holding value	3.5W	
PLC-Output control			$\geq 500\text{ mA}$ 24 V DC	
Drop-out voltage in % of Uc min.			$\leq 60\text{ }\%$ Uc min	
Dips withstand (level 0% according to IEC 61000-4-11) -20 °C $\leq \theta \leq$ +60 °C			15 ms average for Uc = 24 ... 250 V 50/60Hz	
Operating time	between coil energization and:	N.O. contact closing	30 ... 60 ms	15-25 ms
		N.C. contact opening	30 ... 60 ms	15-25 ms
	between coil de-energization and:	N.O. contact closing	10 ... 20 ms	8-25 ms
		N.C. contact opening	10 ... 20 ms	8-25 ms

- Mounting positions

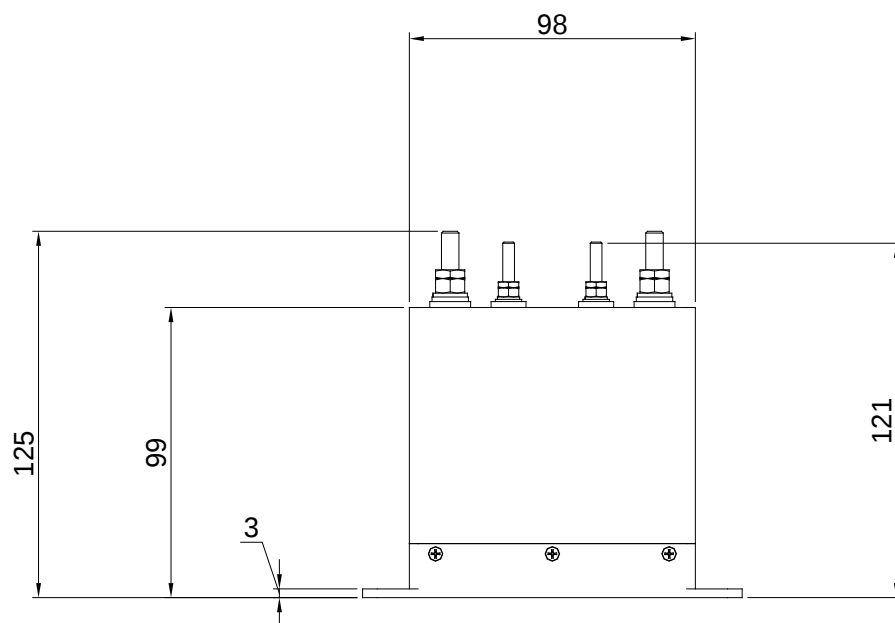
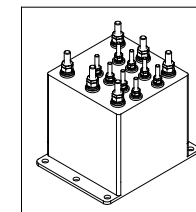


- OUTLINE MIL-004 ... MIL-075 series with auxiliary contacts

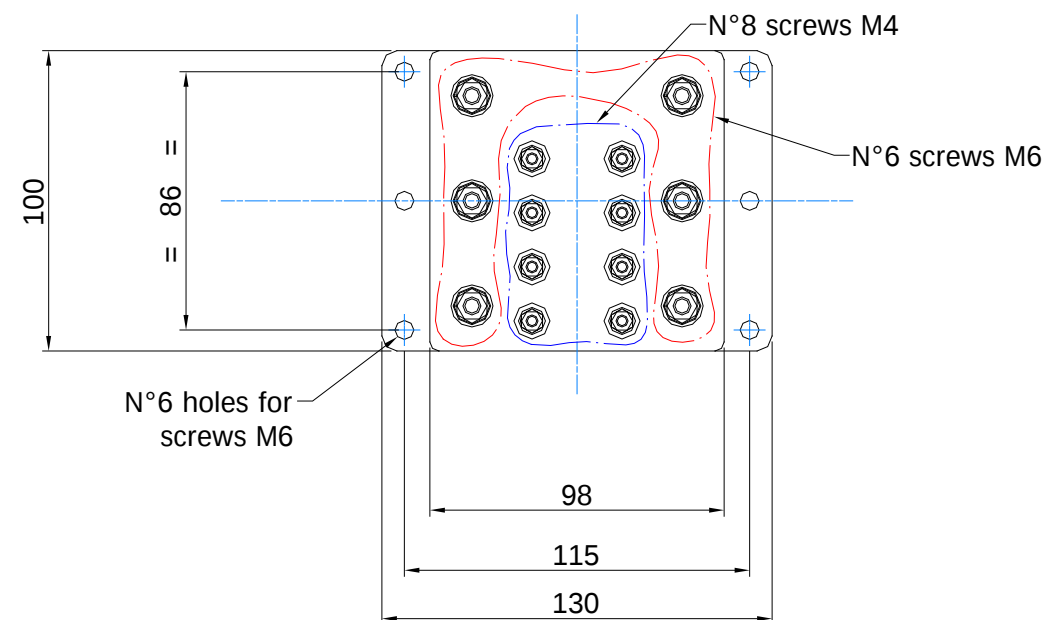


Dimensions in mm

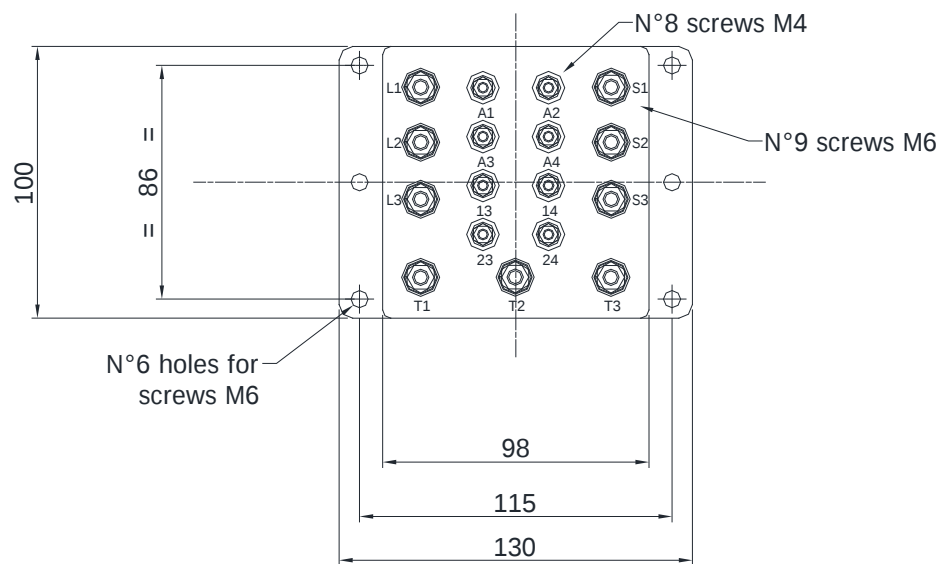
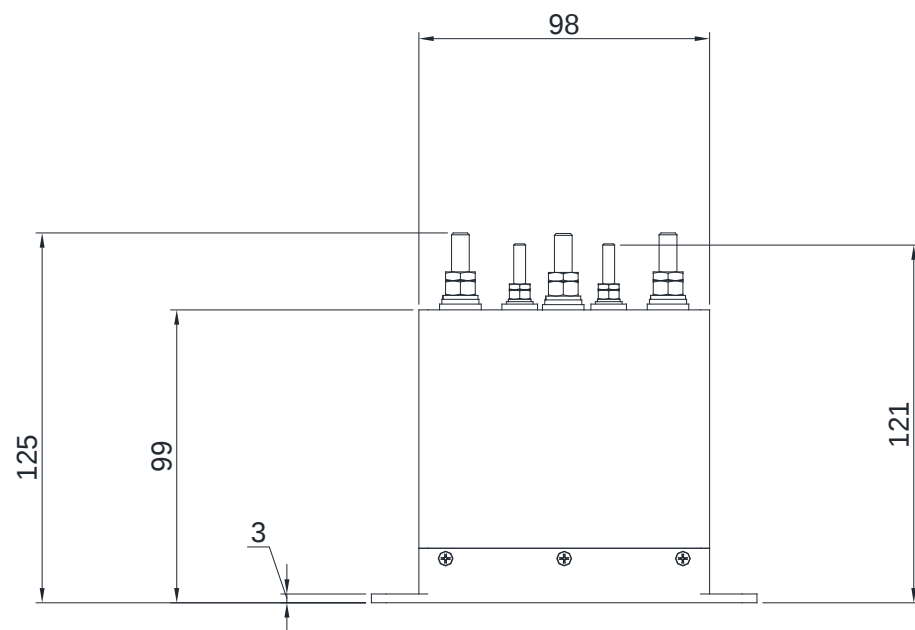
• OUTLINE MIL-004 ... MIL-075 -INV series with auxiliary contacts



Dimensions in mm

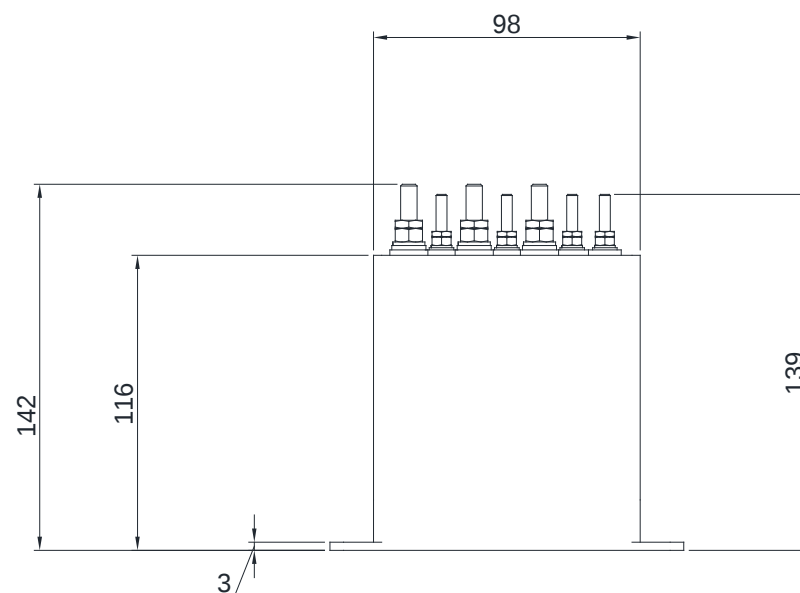
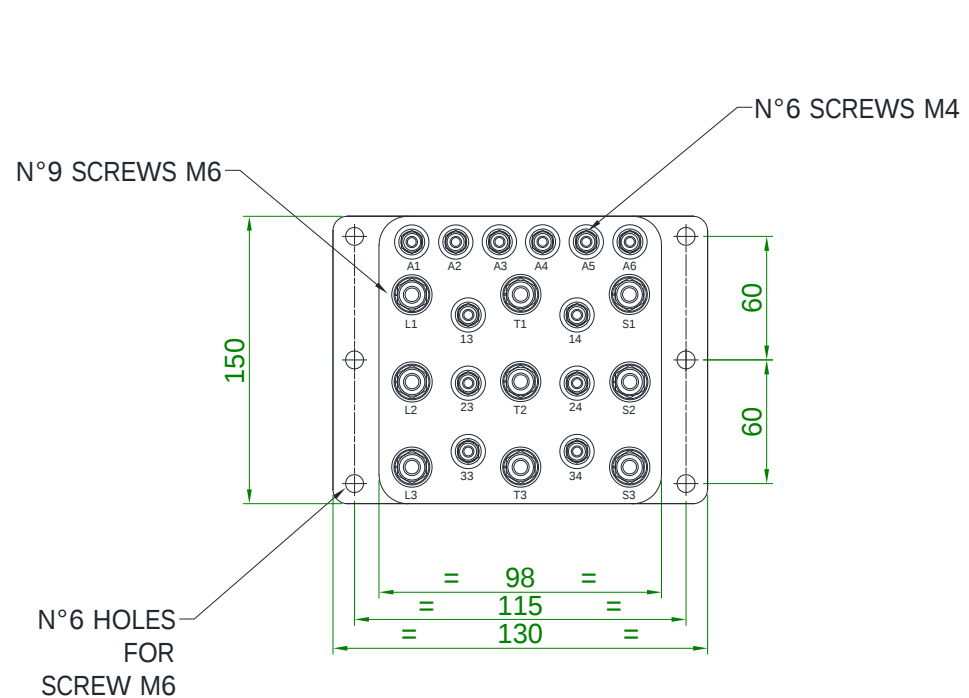


- OUTLINE MIL-004 ... MIL-075 -BYP series with auxiliary contact



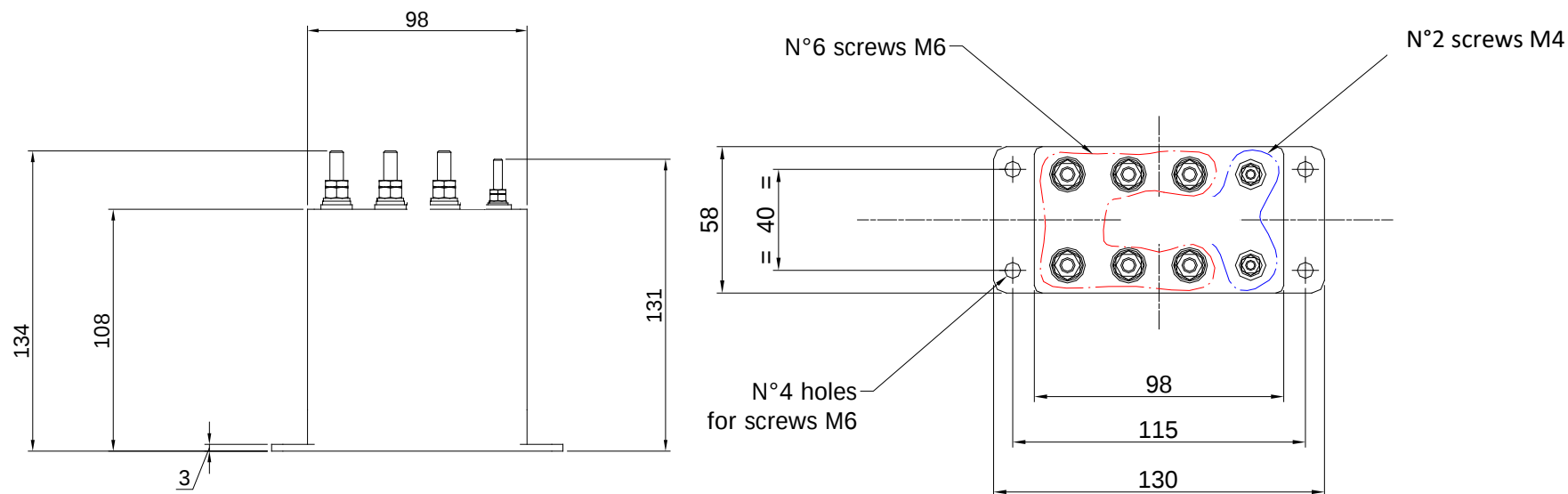
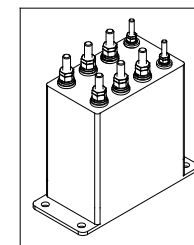
Dimensions in mm

• OUTLINE MIL-004 ... MIL-075 -STR series with auxiliary contacts



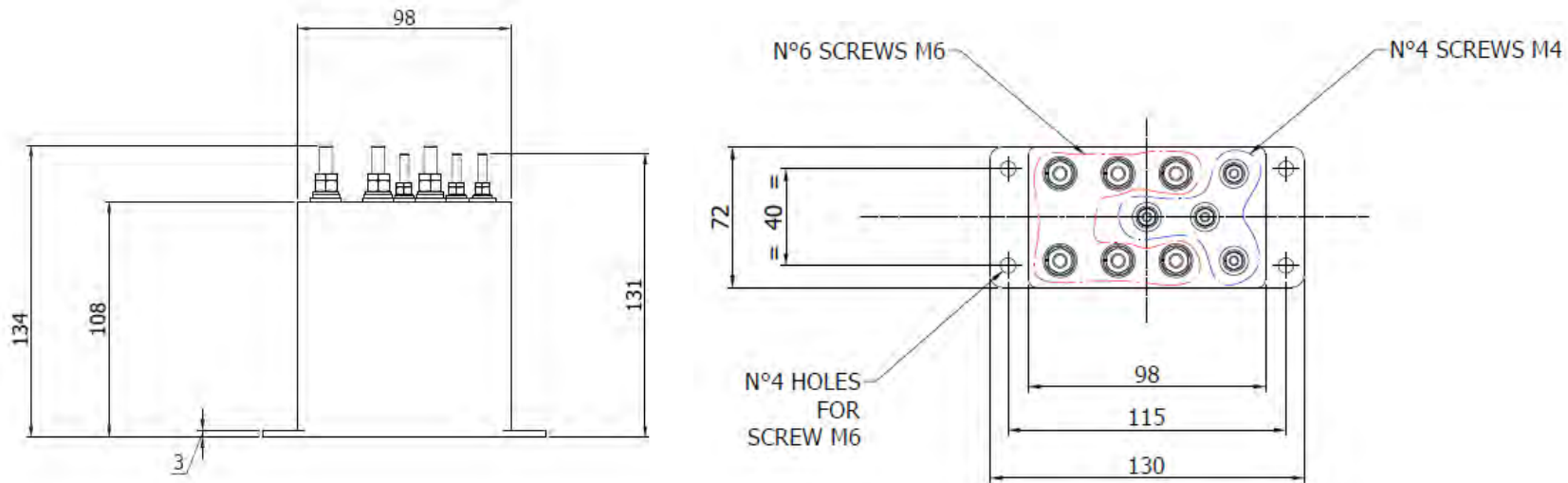
Dimensions in mm

- Ouline MIL-110 ... MIL-185 series without auxiliary contacts



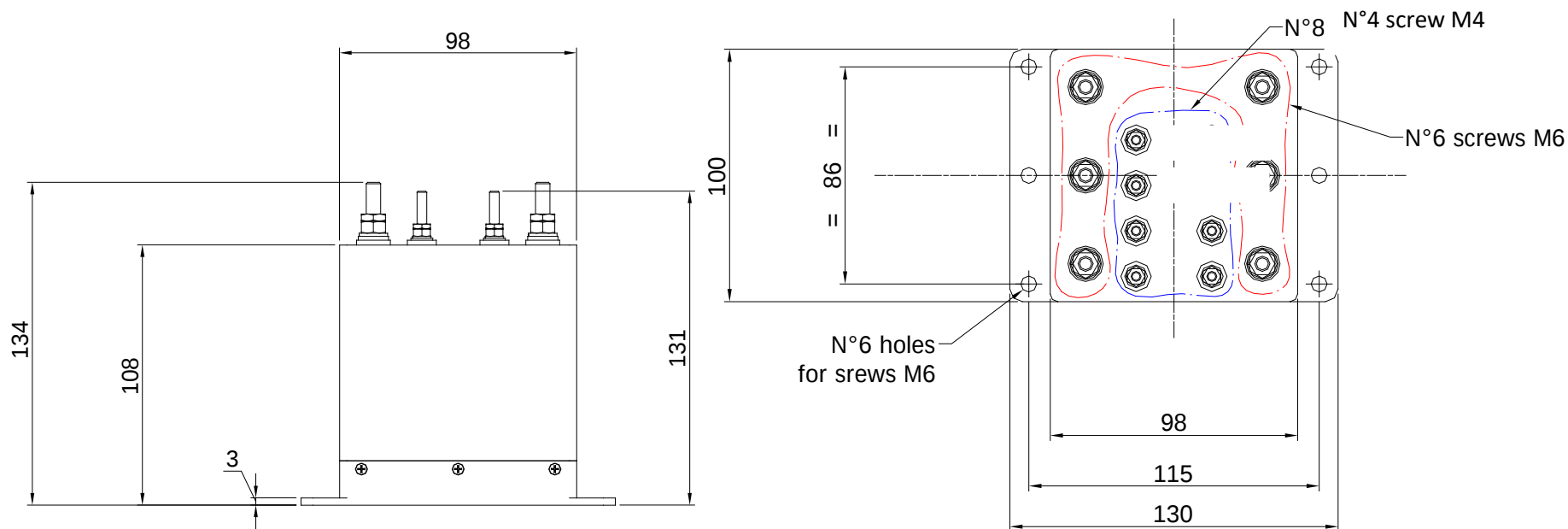
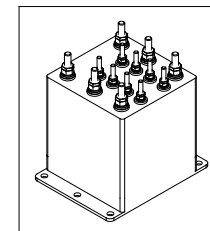
Dimensions in mm

- OUTLINE MIL-110 ... MIL-185 series with auxiliary contacts



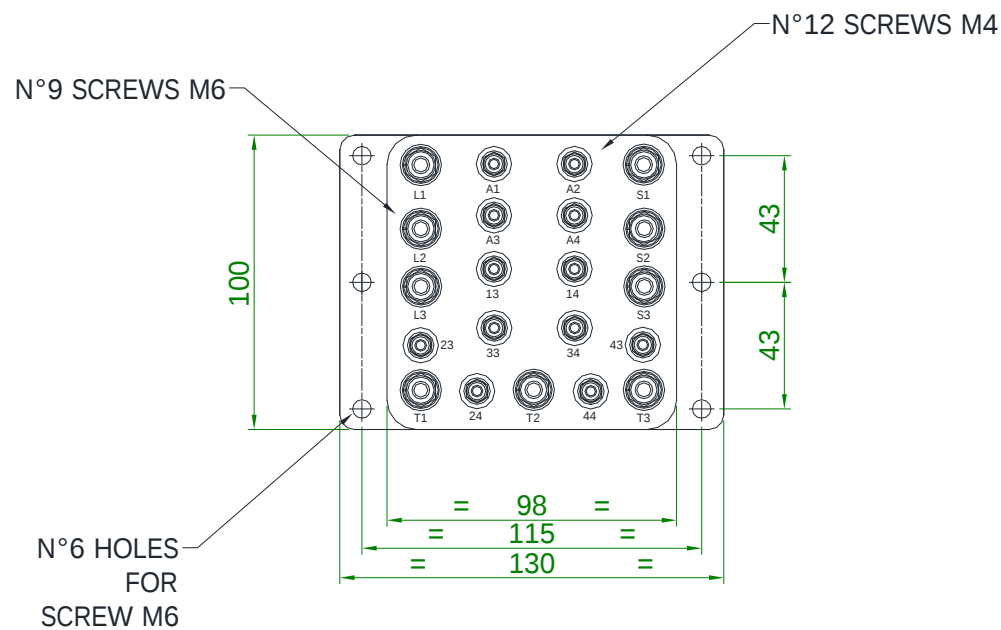
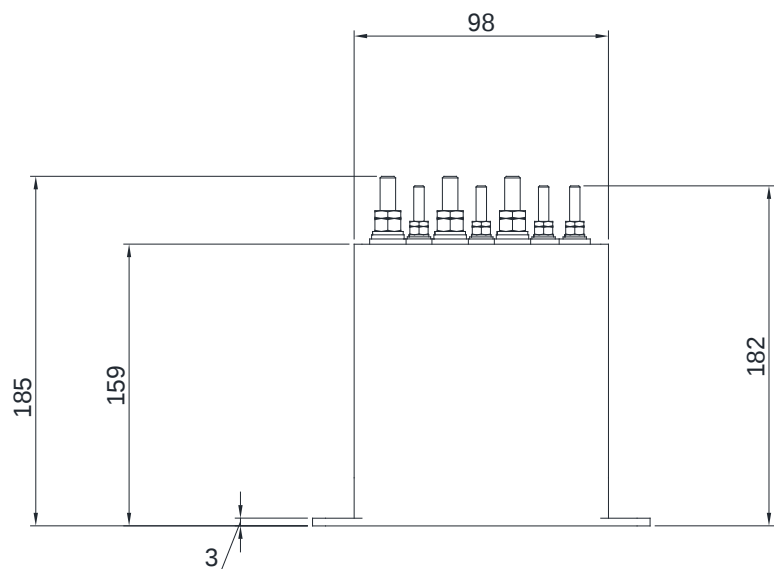
Dimensions in mm

- Ouline MIL-110 ... MIL-185 -INV series without auxiliary contacts



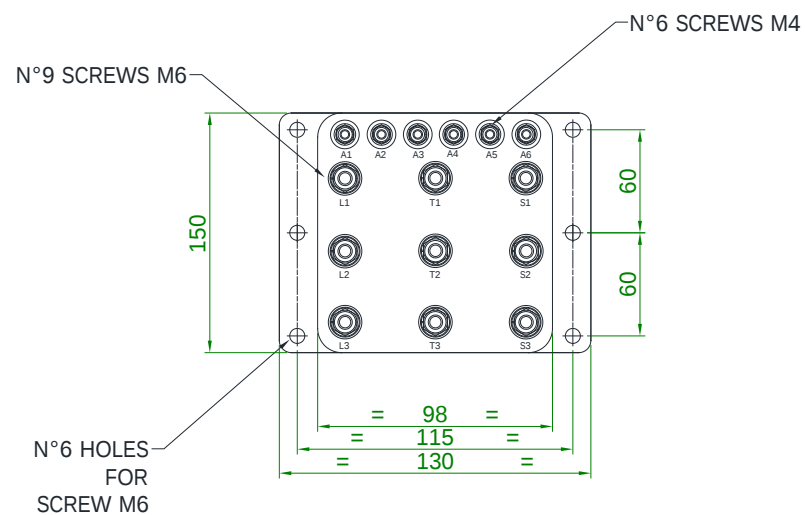
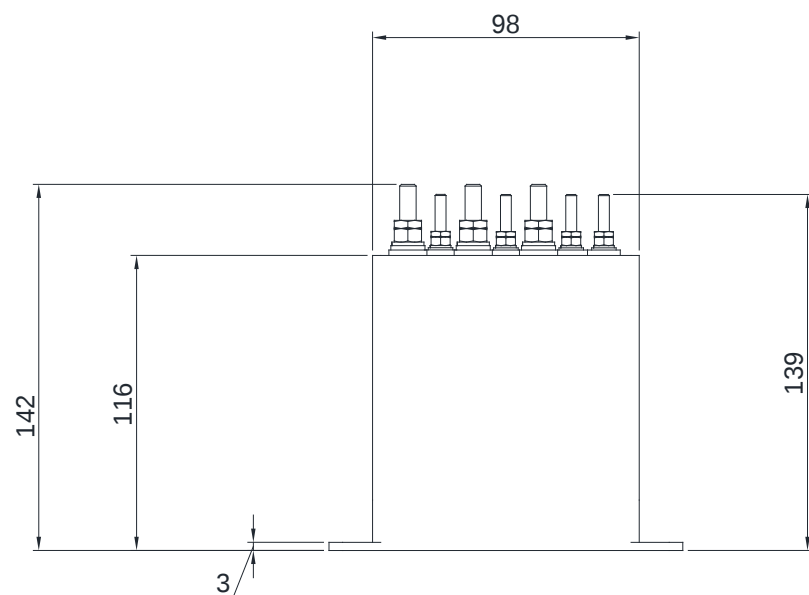
Dimensions in mm

• OULINE MIL-110 ... MIL-185 -BYP series with auxiliary contacts



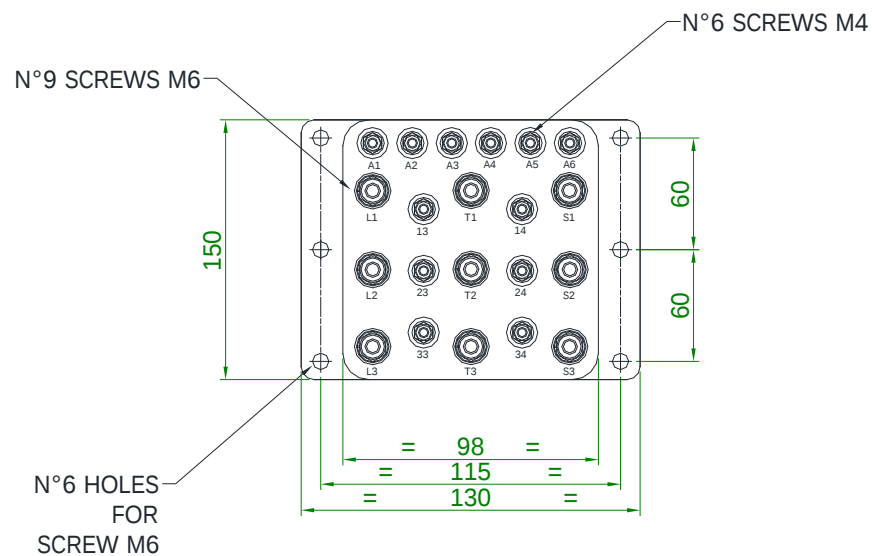
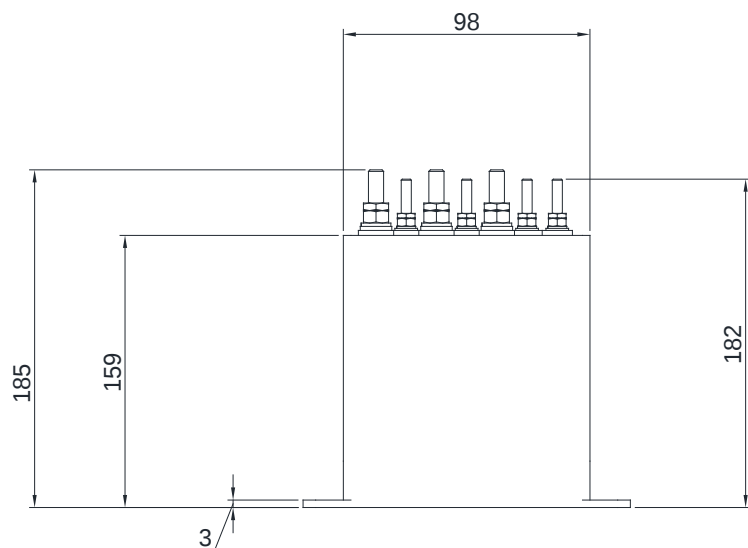
Dimensions in mm

- OUTILE MIL-110 ... MIL-185 -STR series without auxiliary contacts



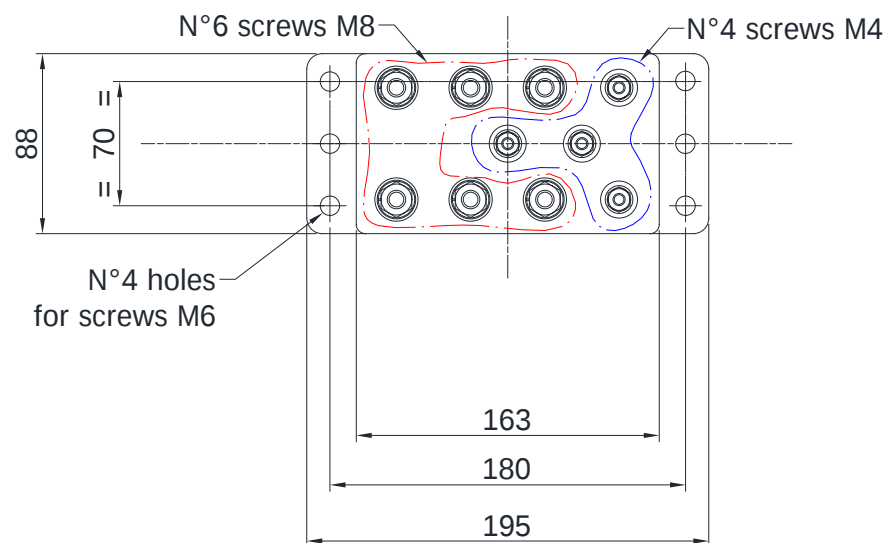
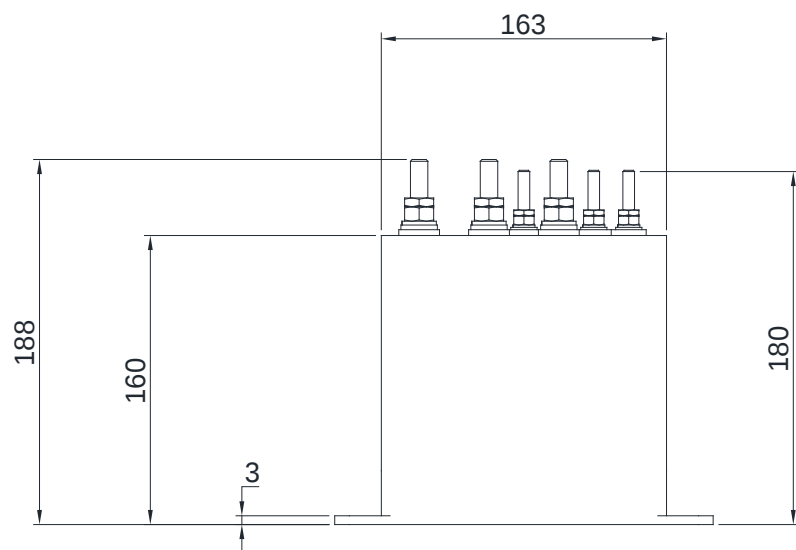
Dimensions in mm

- OULINE MIL-110 ... MIL-185 -STR series with auxiliary contacts



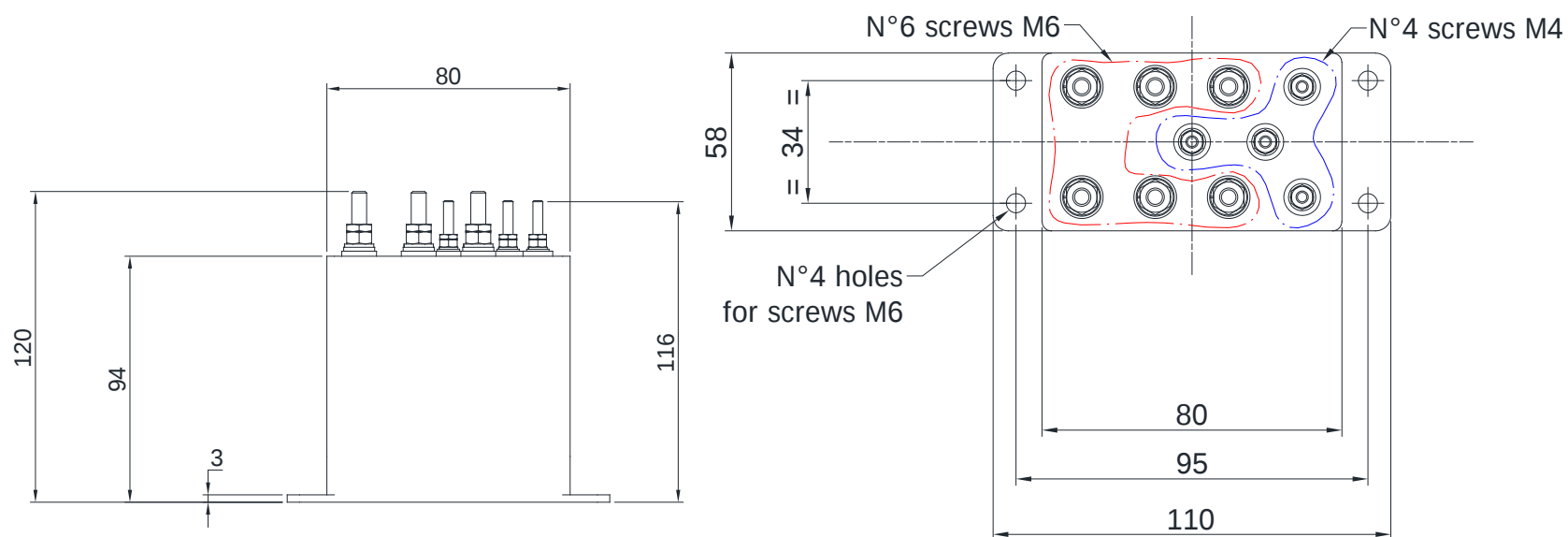
Dimensions in mm

- OUTLINE MIL-220 ... MIL-300 series with auxiliary contacts



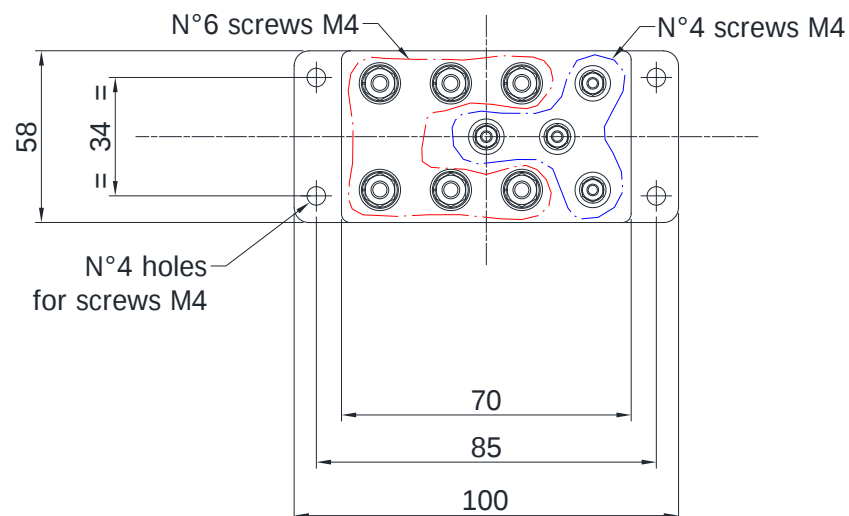
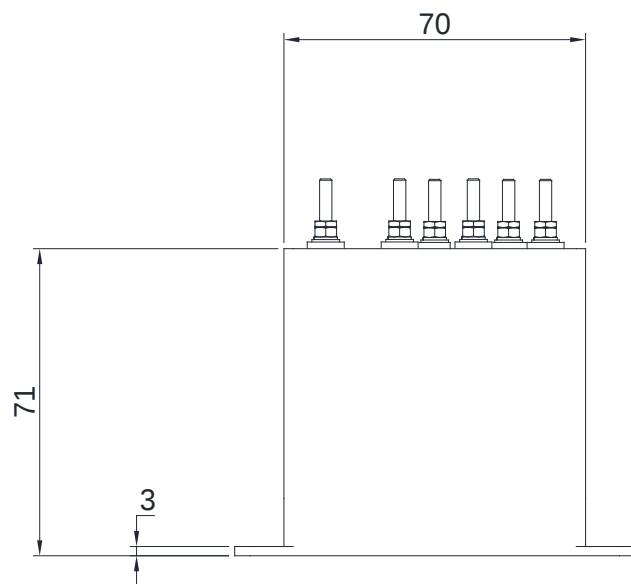
Dimensions in mm

- OUTLINE MIL-MINI all series with auxiliary contacts



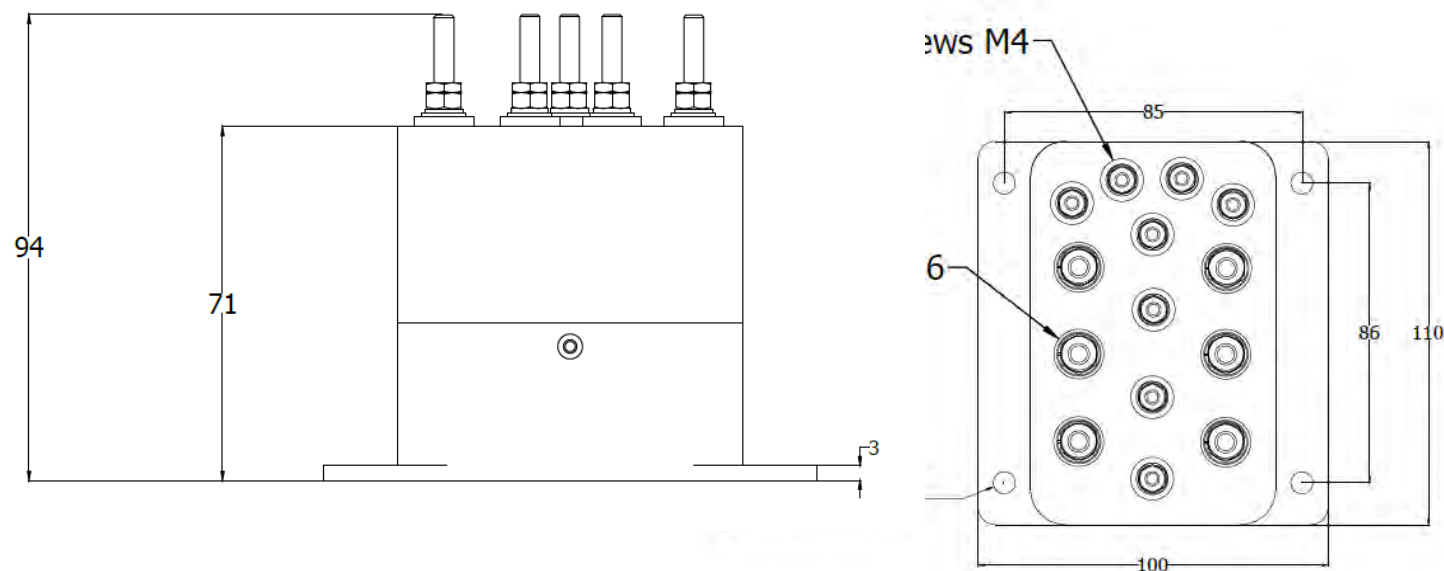
Dimensions in mm

- OUTLINE MIL-MICRO all series with auxiliary contacts



Dimensions in mm

- OUTLINE MIL-MICRO -INV series with auxiliary contacts



Dimensions in mm

Note: the outlines not here listed can be requested to info@energytomotion.com specifying the P/N needed.

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Note

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