



# ML Series Contactor & Thermal Overload Relay



# Technical Data



## Contactors

Type		ML 0	ML 1	ML 1.5
Cat. No.		SS90975	SS90851	SS91851
<b>Conformance Standards</b>				
No. of poles		3	3	3
Thermal rating / Utilization category AC-1 : 3 $\phi$ , 415V, 50Hz*		16 A	25 A	25 A
Insulation voltage , U <sub>i</sub>	(V)	500	500	500
Motor duty 3 $\phi$ , 415V, 50Hz	Utilization Category AC-2	12 A	16 A	25 A
	Utilization Category AC-3	5.5kW/7.5hp/12 A	7.5 kW/10hp/16 A	11 kW/15hp/25 A
	Utilization Category AC-4	4.5kW/ 6hp/10 A	7.5 kW/10hp/16 A	9 kW/12.5hp/21 A
Operational Current I <sub>e</sub> (AC-4 Utilization Category) For contact life of 300000 Operating cycles		6.3 A	10 A	13.5 A
I) Stator duty - 415V,50Hz Duty factor (10 min.cycle duration)	20%	15.5 A	24 A	37 A
	40%	15.5 A	24 A	37 A
	60%	12.5 A	20 A	30 A
II) Rotor duty - Delta connected Duty factor (10 min.cycle duration)	20%	23 A	36 A	56 A
	40%	23 A	36 A	56 A
	60%	19 A	30 A	44 A
III) Max. Rotor Voltage (10 min.cycle duration)	Starting	830 V	830 V	830 V
	Plugging	415 V	415 V	415 V
	Speed control	500 V	500 V	500 V
Capacitor Switching - Delta connected, 415V, 50Hz *** Single Capacitor		3 kVAR	8 kVAR	13 kVAR
Making Capacity at 457 V, Cos $\phi$ - 0.35, 50Hz		120 A	192 A	252 A
Breaking Capacity at 457 V, Cos $\phi$ - 0.35, 50Hz		100 A	160 A	210 A
DC rating (with 3 poles in series) and ac coil operation	DC 1 - 110 V	10 A	16 A	25 A
	DC 1 - 220 V	10 A	16 A	25 A
	DC 3 - 110 V	10 A	16 A	25 A
	DC 3 - 220 V	10 A	10 A	10 A
	DC 5 - 110 V	10 A	16 A	25 A
	DC 5 - 220 V	7A	7.5 A	7.5 A
Mechanical life : No of operating cycles		15 x 10 <sup>6</sup>	15 x 10 <sup>6</sup>	15 x 10 <sup>6</sup>
Max. Frequency of operation : Operating cycles/hr	Mechanical	3000	3000	3000
	Utilization Category AC-1	3000	3000	3000
	Utilization Category AC-2	750	750	750
	Utilization Category AC-3	750	750	750
Utilization Category AC-4	250	250	250	
Service temperature		-20 C° to + 55 C°	-20° C to + 55° C	-20° C to + 55° C
Main terminal capacity	Wires up to (in mm <sup>2</sup> )	2 x 10	2 x 10	2 x 10
	Lugs up to (in mm)	16	16	16

## Auxiliary Contacts

No. of built in auxiliary contacts		2 NO + 2 NC	2NO + 2 NC	2NO + 2 NC
Operating Sequence				
Thermal Rating at 415 V, 50Hz		16 A	16 A	16 A
Aux. Terminal Capacity : Wires up to (in mm <sup>2</sup> )			2 x 2.5	2 x 2.5
AC -15 Rating at 415 V, 50Hz		4 A	4 A	4 A
Making Capacity at 415 V, Cos $\phi$ - 0.35,50Hz		80 A	80 A	80 A
Breaking Capacity at 415 V, Cos $\phi$ - 0.35 $\phi$ , 50Hz		70 A	70 A	70 A

## Coil

Voltages Available for 50Hz operation , U <sub>c</sub>	(V)	12, 24, 42, 110, 220/230, 240/250 320, 360, 380, 415/440, 525		
Pick - up	VA	60	60	60
	Cos $\phi$	0.8	0.8	0.8
Hold on	VA	15	15	15
	Watts	5	5	5
Limits of operation	Pick - up (% U <sub>c</sub> )	75 - 110	75 - 110	75 - 110
	Drop - off (% U <sub>c</sub> )	65 - 15	65 - 15	65 - 15
Typical closing delay in msec		5 - 35	5 - 35	5 - 35
Typical opening delay in msec		5 - 20	5 - 20	5 - 20
Weight (unpacked) in kg.		0.5	0.5	0.5

\*\*\* Please connect inductance in series for capacitor switching

\*\* Upto 4 Nos. Add on auxiliary contact blocks ( each 1NO + 1NC ) can be mounted.

\* Upto 2 Nos. Add on auxiliary contact blocks ( each 1NO + 1NC ) can be mounted.



ML 2	ML 3	ML 4	ML 6	ML 10	ML 12
SS90701	SS90721	SS90910	SS90921	SS90935	SS91010

IS 13947- 4 - 1, IEC 60947 - 4 - 1

3	3	3	3	3	3
40 A	45 A	100 A	125 A	250 A	400 A
500	500	660	660	660	660
32 A	40 A	70 A	110 A	200 A	300 A
15 kW/20hp/32 A	22 kW/30hp/40 A	37 kW/50hp/70 A	55 kW/75hp/110 A	110 kW/150hp/200 A	168 kW/225hp/300 A
15 kW/20hp/32 A	22 kW/30hp/40 A	37 kW/50hp/70 A	45 kW/60hp/85 A	110 kW/150hp/200 A	140 kW/190hp/250 A
17 A	22 A	35 A	46 A	90 A	112 A
48 A	60 A	95 A	165 A	250 A	375 A
48 A	60 A	95 A	165 A	250 A	375 A
40 A	50 A	78 A	135 A	206 A	310 A
72 A	90 A	157 A	270 A	370 A	560 A
72 A	90 A	157 A	270 A	370 A	560 A
60 A	75 A	118 A	206 A	310 A	465 A
830 V	830 V	830 V	830 V	830 V	830 V
415 V	415 V	415 V	415 V	415 V	415 V
500 V	500 V	500 V	500 V	500 V	500 V
20 kVAR	20 kVAR	50 kVAR	65 kVAR	125 kVAR	175 kVAR
400 A	480 A	840 A	1200 A	2500 A	3000 A
320 A	400 A	700 A	1000 A	2000 A	2500 A
32 A	40 A	63 A	85 A	200 A	300 A
32 A	40 A	63 A	85 A	200 A	300 A
32 A	40 A	63 A	85 A	200 A	300 A
32 A	40 A	63 A	63 A	200 A	300 A
32 A	40 A	63 A	85 A	200 A	300 A
32 A	40 A	63 A	63 A	200 A	300 A
10 x 10 <sup>6</sup>	10 x 10 <sup>6</sup>	10 x 10 <sup>6</sup>	10 x 10 <sup>6</sup>	10 x 10 <sup>6</sup>	10 x 10 <sup>6</sup>
2000	2000	1200	1200	1200	1200
750	750	1000	750	750	750
750	750	500	500	500	500
750	750	750	750	500	500
250	250	250	250	250	250
-20°C to + 55° C	-20°C to + 55° C	-20°C to + 55° C	-20° C to + 55° C	-20° C to + 55° C	-20° C to + 55° C
2 x 25	2 x 25	-	-	-	-
50	50	50	95	240	240

2NO + 2 NC	2NO + 2 NC	2NO + 2 NC**	2NO + 2 NC**	2NO + 2 NC*	2NO + 2 NC*
<b>Break Before Make</b>					
16 A	16 A	16 A	16 A	16 A	16 A
2 x 2.5	2 x 2.5	2 x 2.5	2 x 2.5	2 x 2.5	2 x 2.5
4 A	4 A	4 A	4 A	4 A	4 A
80 A	80 A	80 A	80 A	80 A	80 A
70 A	70 A	70 A	70 A	70 A	70 A

42, 110, 220, 240 320, 360, 380, 415/440, 525	110, 220 240, 415, 525	110, 220, 240 380, 415, 525
120	450	1450
0.4	0.3	0.25
20	50	85
8.5	17	27
75 - 110	75 - 110	75 - 110
65 - 15	65 - 15	65 - 15
10 - 35	10 - 35	15 - 45
5 - 25	10 - 40	5 - 25
0.95	2.9	9.0

# Thermal Overload Relay



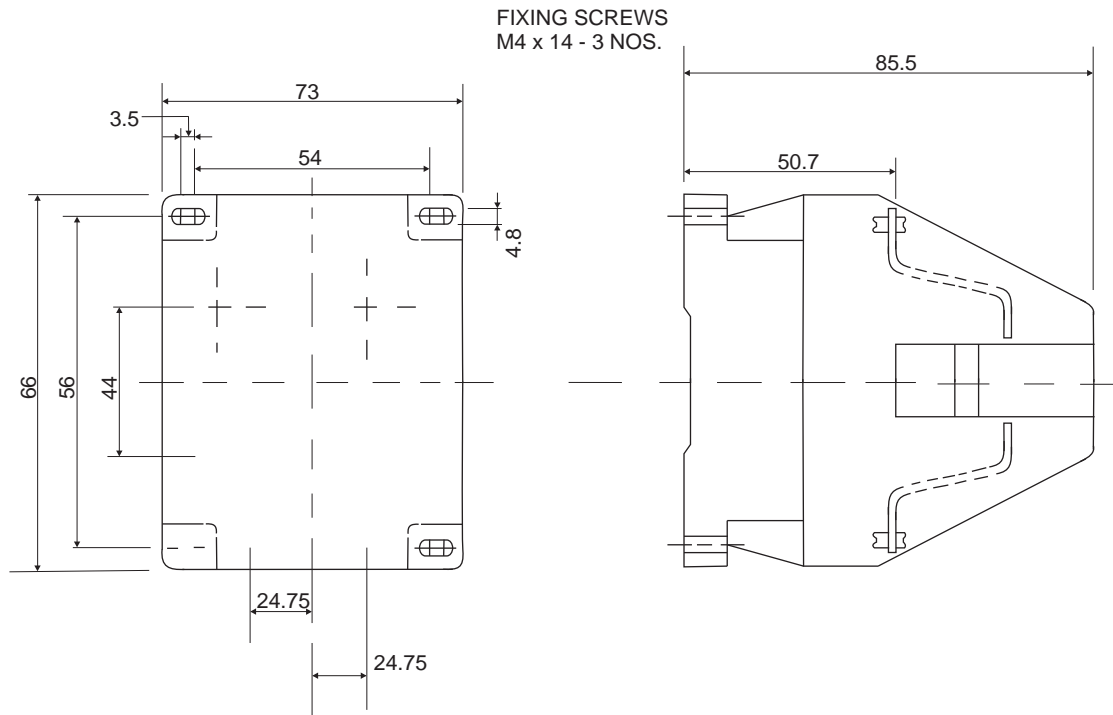
Type		ML 0 / 1 / 1.5	ML 2 / 3
Cat. No.		SS91858	SS91859
Ratings			
Rated insulation voltage (Ui)	V	500	500
Rated impulse strength (Uimp)	KV	6	6
Service temperature	°C	-5 to + 55	-5 to + 55
Rated thermal current I <sub>th</sub> at 415V, 50Hz	A	6	6
Rated operational current for AC-15 utilization category at 50Hz (A)	24V	6	6
	110V	5	5
	220V	3	3
	380/415V	2	2
	500V	2	2
Built in contacts		1 Start	1 Start
		1 Off / Reset	1 Off / Reset
		1 Alarm (NO)	1 Alarm (NO)
Tripping class (A)		10	10
Max. Frequency of operation	Op.cycles/hr	30	30
Main Terminal capacity	Lug(m <sup>2</sup> )	16	50
Aux. Terminal capacity	Wires(m <sup>2</sup> )	2 x 2.5	2 x 2.5

## Accessories & Spares

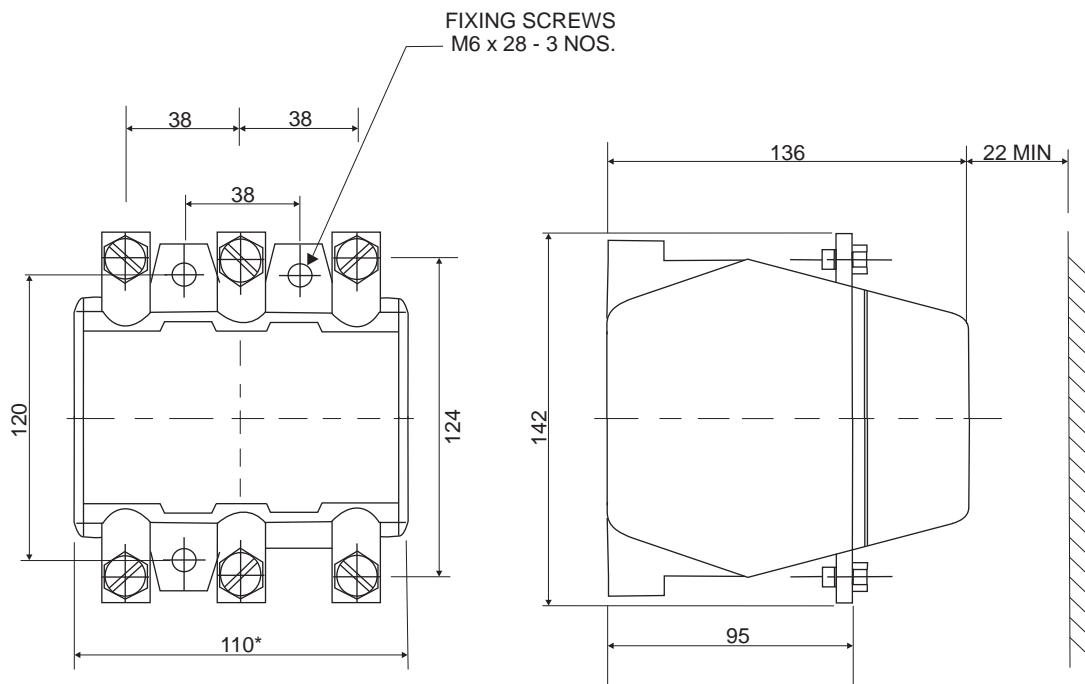
CONTACTOR TYPE	AUX.ADD ON BLOCK	MECHANICAL INTERLOCK KIT	SPARE COIL	SPARE KIT
ML 0	Not available	Not available	SS90873	SS90978
ML 1				SS90896
ML 1.5				SS91467
ML 2	Not available	SS91694	SS90545	SS90544
ML 3				SS90848
ML 4	Cat. No. SS91494	SS91675	SS91258	SS91660
ML 6				SS91670
ML 10	Cat. No. SS91474	SS91017	SS91011	SS90936
ML 12				SS91127

# Overall Dimensions

## ML 0/1/1.5 Contactor (Without shroud)



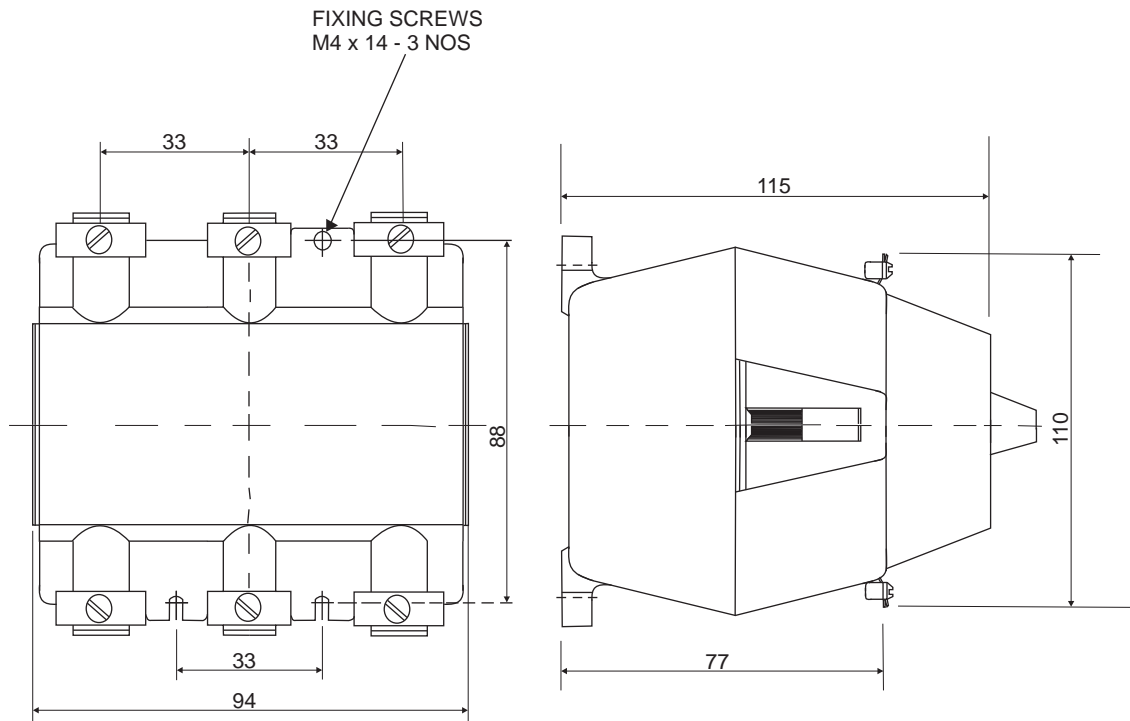
## ML 4 Contactor



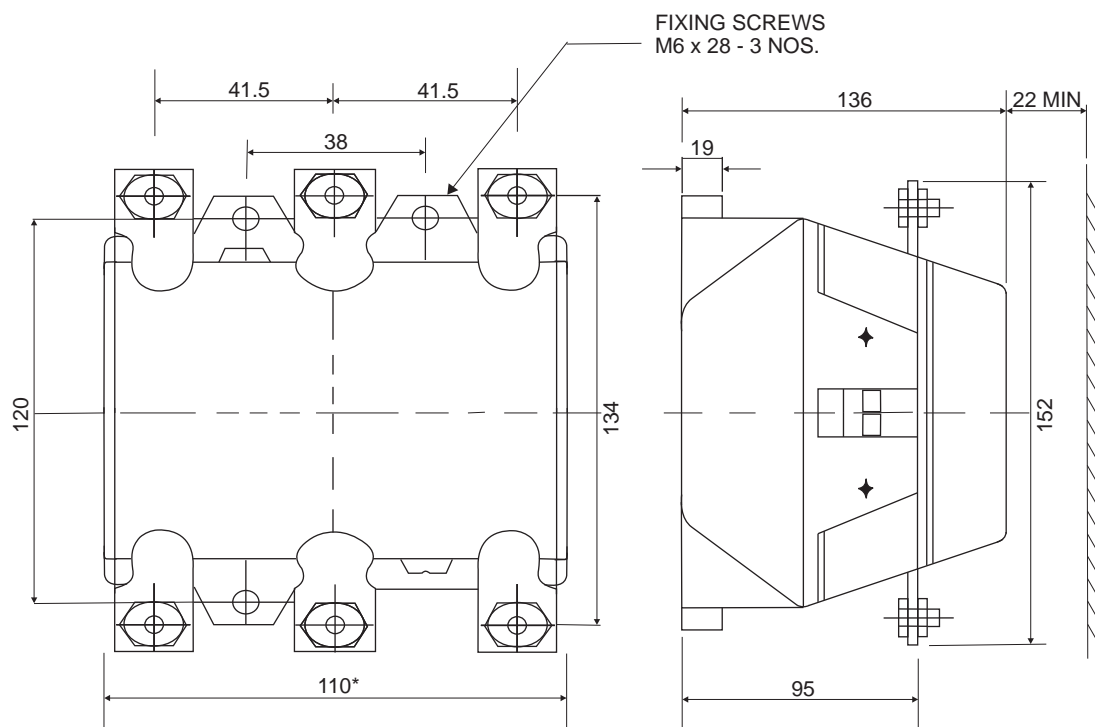
\*Provide 12 mm extra for each Add-on block

# Overall Dimensions

## ML 2/3 Contactor



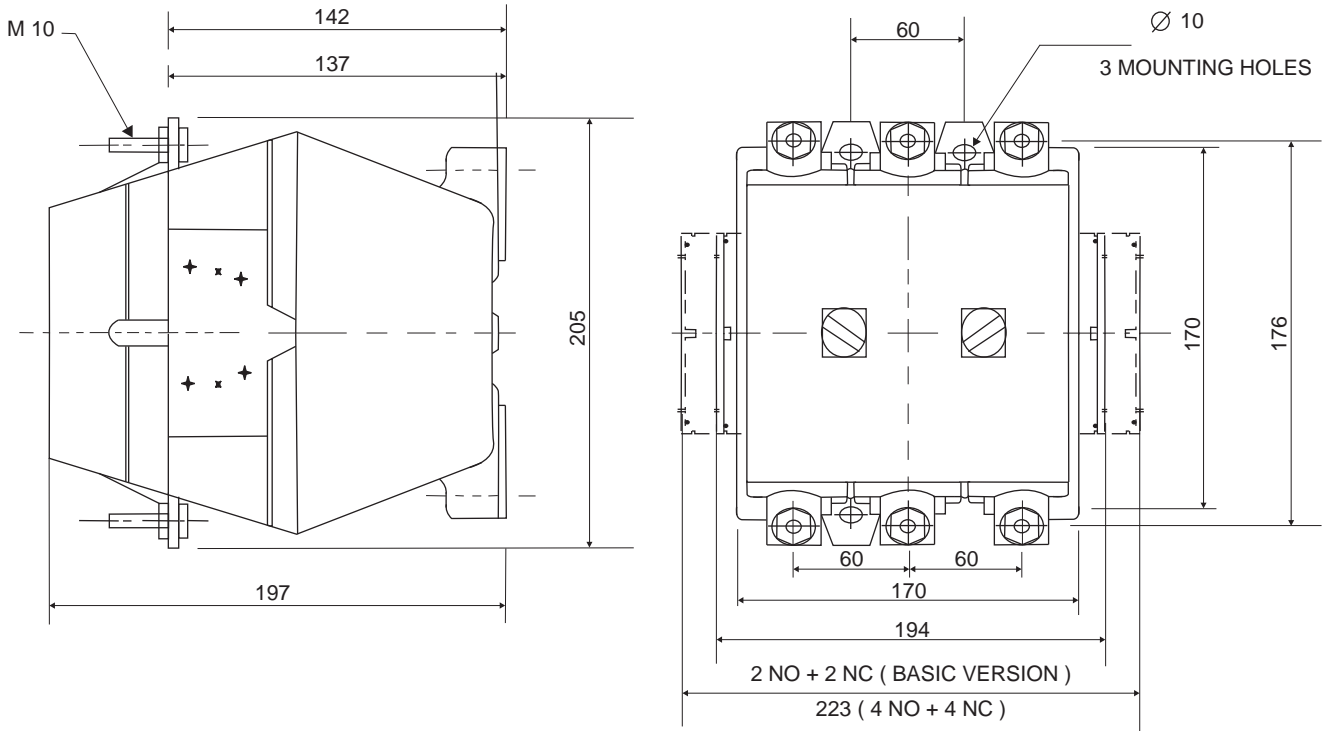
## ML 6 Contactor



\*Provide 12 mm extra for each Add-on block

# Overall Dimensions

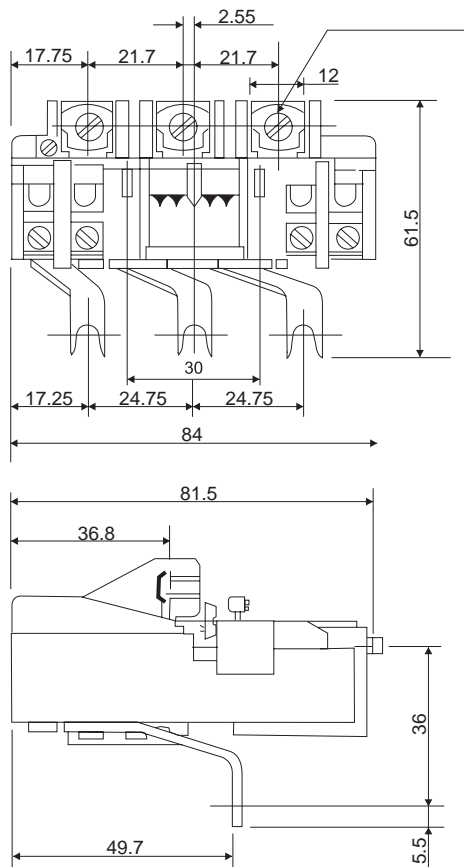
## ML 10 / 12 Contactor



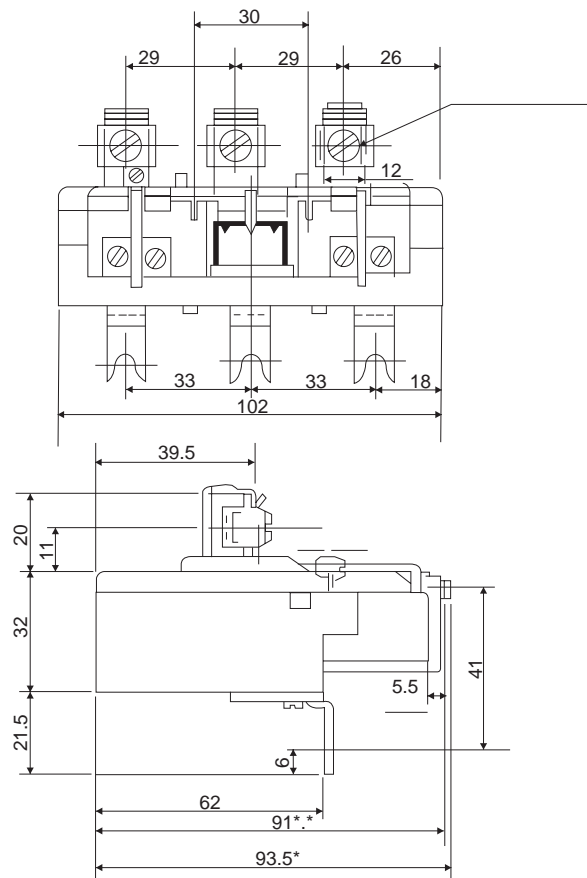
## ML 0/1/1.5

## Thermal Overload Relay

## ML 2/3



TERMINAL SCREWS M4



TERMINAL SCREWS M4