

# Voltage Monitoring Series SM 500

- Protects against Phase Loss, Phase Reversal & Phase Asymmetry
- Can be configured for 3 Phase 4 Wire or 1 Phase system
- Selectable Over Voltage / Under Voltage Trip level
- Selectable Time Delay
- LED Indications for Power and Fault conditions
- Voltage Sensing principle
- 1 C/O or 2 C/O Configuration




## Ordering Information

Cat. No.	Description
MD71BH	240 VAC, UV / OV with Selectable ON Delay (0.5 to 15 sec), 1 C/O
MD71BF	240 VAC, UV / OV with Selectable OFF Delay (0.5 to 15 sec), 1 C/O
MD71B9	240 VAC, UV / OV with Selectable ON Delay (0.5 s to 15 min), 1 C/O

# Voltage Monitoring Series SM 500



Cat. No.		MD71BH	MD71BF	MD71B9
<b>Parameters</b>				
Supply Voltage (ϕ)		240 VAC (1 Phase & 3 Phase, 4 Wire)		
Frequency		50/60 Hz		
Power Consumption (Max.)		4 VA		
Trip Settings	Phase Loss	Yes	Yes	Yes
	Phase Sequence	N.A	N.A	N.A
	Phase Asymmetry	N.A	N.A	N.A
	Under Voltage	55% to 95% (of ϕ)		
	Over Voltage	105% to 125% (of ϕ)		
Time Delay	ON Delay	0.5 to 15 s (Selectable)	5 s	0.5 s to 15 min (Selectable)
	Trip Time (OFF Delay)	5 s	0.5 to 15 s (Selectable)	5 s
Output	Relay Output	1 C/O		
	Contact Rating	5A @ 250 VAC / 28 VDC (Resistive)		
	Electrical Life	1X10 <sup>5</sup>		
	Mechanical Life	3X10 <sup>6</sup>		
Utilization Category	AC - 15	Rated Voltage (Ue): 120/240 V, Rated Current (Ie): 3.0/1.5 A		
	DC - 13	Rated Voltage (Ue): 24/125/250 V, Rated Current (Ie): 2.0/0.22/0.1 A		
LED Indication		Separate indications for Power ON, UV and OV		
Operating Temperature		-15° C To + 55° C		
Storage Temperature		-25° C To + 70° C		
Humidity (Non Condensing)		95% (Rh)		
Enclosure		Flame Retardant UL 94-V0		
Dimension (W x H x D) (in mm)		36 X 90 X 60		
Weight (unpacked) Approx.		120 g		
Mounting		Base / DIN rail		
Degree of Protection		IP 20 for Terminals, IP 40 for Enclosure		
Certification		 		

## EMI / EMC

Harmonic Current Emissions	IEC 61000-3-2
ESD	IEC 61000-4-2
Radiated Susceptibility	IEC 61000-4-3
Electrical Fast Transients	IEC 61000-4-4
Surges	IEC 61000-4-5
Conducted Susceptibility	IEC 61000-4-6
Voltage Dips & Interruptions (AC)	IEC 61000-4-11
Conducted Emission	CISPR 14-1
Radiated Emission	CISPR 14-1

## Environmental

Cold Heat	IEC 60068-2-1
Dry Heat	IEC 60068-2-2
Vibration	IEC 60068-2-6
Repetitive Shock	IEC 60068-2-27
Non-Repetitive Shock	IEC 60068-2-27

Note: 1) Voltage setting is with respect to Neutral. Voltage Setting Accuracy: ± 5 % of Full Scale; Time Setting Accuracy: ± 10 % of Full Scale

# Voltage Monitoring Series SM 500





## Ordering Information

Cat. No.	Description
MG73B9	240 VAC, UV / OV & Single Phasing Preventor (SPP) with Selectable ON Delay (0.5 s to 15 min), 2 C/O
MG73BH	240 VAC, UV / OV & SPP with Selectable ON Delay (0.5 to 15 sec), 2 C/O
MGH3BH	220 VAC, UV / OV & SPP with Selectable ON Delay (0.5 to 15 sec), 2 C/O
MG73BF	240 VAC, UV / OV & SPP with Selectable OFF Delay (0.5 to 15 sec), 2 C/O
MGI3BF	230 VAC, UV / OV & SPP with Selectable OFF Delay (0.5 to 15 sec), 2 C/O

# Voltage Monitoring Series SM 500



Cat. No.		MG73BH	MG73BF	MG73B9
<b>Parameters</b>				
Supply Voltage (φ)		240 VAC (1 Phase & 3 Phase, 4 Wire)		
Frequency		50/60 Hz		
Power Consumption (Max.)		5 VA		
Trip Settings	Phase Loss	Yes		
	Phase Sequence	Yes		
	Phase Asymmetry	10% (of φ)		
	Under Voltage	55% to 95% (of φ)		
	Over Voltage	105% to 125% (of φ)		
	Hysteresis	7 V (± 2 V)		
Time Delay	ON Delay	0.5 to 15 s (Selectable)	5 s	0.5 s to 15 min (Selectable)
	Trip Time (OFF Delay)	5 s	0.5 to 15 s (Selectable)	5 s
Output	Relay Output	2 C/O		
	Contact Rating	5A @ 250 VAC / 28 VDC (Resistive)		
	Electrical Life	1X10 <sup>5</sup>		
	Mechanical Life	3X10 <sup>6</sup>		
Utilization Category	AC - 15	Rated Voltage (Ue): 120/240 V, Rated Current (Ie): 3.0/1.5 A		
	DC - 13	Rated Voltage (Ue): 24/125/250 V, Rated Current (Ie): 2.0/0.22/0.1 A		
LED Indication		Separate indications for Power ON, UV and OV; ON: Phase Reverse; BLINK: Phase Asymmetry		
Operating Temperature		-15° C To + 55° C		
Storage Temperature		-25° C To + 70° C		
Humidity (Non Condensing)		95% (Rh)		
Enclosure		Flame Retardant UL 94-V0		
Dimension (W x H x D) (in mm)		36 X 90 X 60		
Weight (unpacked)		120 g		
Mounting		Base / DIN rail		
Degree of Protection		IP 20 for Terminals, IP 40 for Enclosure		
Certification		 		

## EMI / EMC

Harmonic Current Emissions	IEC 61000-3-2
ESD	IEC 61000-4-2
Radiated Susceptibility	IEC 61000-4-3
Electrical Fast Transients	IEC 61000-4-4
Surges	IEC 61000-4-5
Conducted Susceptibility	IEC 61000-4-6
Voltage Dips & Interruptions (AC)	IEC 61000-4-11
Conducted Emission	CISPR 14-1
Radiated Emission	CISPR 14-1

## Environmental

Cold Heat	IEC 60068-2-1
Dry Heat	IEC 60068-2-2
Vibration	IEC 60068-2-6
Repetitive Shock	IEC 60068-2-27
Non-Repetitive Shock	IEC 60068-2-27

Note: 1) Voltage setting is with respect to Neutral. Voltage Setting Accuracy: ± 5 % of Full Scale; Time Setting Accuracy: ± 10 % of Full Scale

# Voltage Monitoring Series SM500 - Neutral Loss Protection

- Phase loss (failure) detection
- Neutral loss detection
- Phase reverse detection
- Phase asymmetry
- Adjustable Over & Under voltage trip level
- LED indication for all failure conditions
- Automatic recovery on fault removal



## Ordering Information



Cat. No.  
MAC04D0100

Description  
415V AC, Neutral Loss Protection with Phase and Voltage Control, 2 C/O

# Voltage Monitoring Series SM500 - Neutral Loss Protection



**Cat. No.** MAC04D0100

Parameters					
Supply Voltage (φ)		415 VAC (Ph-Ph); 3 Phase, 4 Wire			
Frequency		47 to 53 Hz			
Power Consumption (Max.)		10 VA (max)			
Trip Settings	Phase Loss	Yes			
	Phase Sequence	Yes			
	Phase Asymmetry	94V ± 4V (Ph-Ph)			
	Under Voltage	55% to 95% (of φ)			
	Over Voltage	105% to 125% (of φ)			
	Hysteresis	7 V (± 2 V)			
Time Delay	ON Delay	5 s ±1 s (Fixed)			
	Trip Time (OFF Delay)	For Phase failure phase Imbalance Under voltage / Over Voltage	5 s ±1 s (Fixed)		
		For Neutral Fail	500 ms -1s		
Output	Relay Output	2 C/O			
	Contact Rating	5A @ 250 VAC / 28 VDC (Resistive)			
	Electrical Life	1X10 <sup>5</sup>			
	Mechanical Life	1X10 <sup>7</sup>			
Utilization Category	AC - 15	Rated Voltage (Ue): 120/240 V, Rated Current (Ie): 3.0/1.5 A			
	DC - 13	Rated Voltage (Ue): 24/125/250 V, Rated Current (Ie): 2.0/0.22/0.1 A			
LED Indications on front plate	Respective fault condition will be indicated by LED immediately & Relay will be tripped after specified trip time only.				
		GREEN	UV	OV	Blink: ASY, ON: REV
	Power ON	ON	OFF	OFF	OFF
	Phase reverse	ON	OFF	OFF	ON
	Asymmetry	ON	OFF	OFF	BLINK
	UV	ON	ON	OFF	OFF
	OV	ON	OFF	ON	OFF
	Phase Fail	BLINK	OFF	OFF	OFF
	Phase Fail *	BLINK	ON	OFF	BLINK
Neutral Fail	ON	BLINK	BLINK	BLINK	
* Phase fail indications when I/P voltages are below UV set point and below asymmetry					
Operating Temperature		-10° C To + 60° C			
Storage Temperature		-10° C To + 70° C			
Humidity (Non Condensing)		95% (Rh)			
Enclosure		Flame Retardant UL 94-V0			
Dimension (W x H x D) (in mm)		36 X 90 X 60			
Weight (unpacked)		120 g			
Mounting		Base / DIN rail			
Degree of Protection		IP 20 for Terminals, IP 40 for Enclosure			
Certification		 			

## EMI / EMC

Harmonic Current Emissions	IEC 61000-3-2
ESD	IEC 61000-4-2
Radiated Susceptibility	IEC 61000-4-3
Electrical Fast Transients	IEC 61000-4-4
Surges	IEC 61000-4-5
Conducted Susceptibility	IEC 61000-4-6
Voltage Dips & Interruptions (AC)	IEC 61000-4-11
Conducted Emission	CISPR 14-1
Radiated Emission	CISPR 14-1

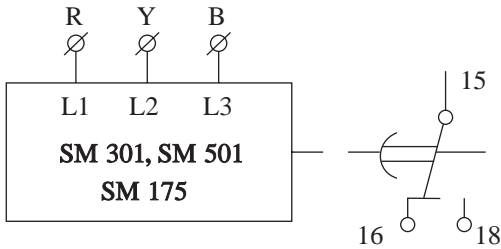
## Environmental

Cold Heat	IEC 60068-2-1
Dry Heat	IEC 60068-2-2
Vibration	IEC 60068-2-6
Repetitive Shock	IEC 60068-2-27
Non-Repetitive Shock	IEC 60068-2-27

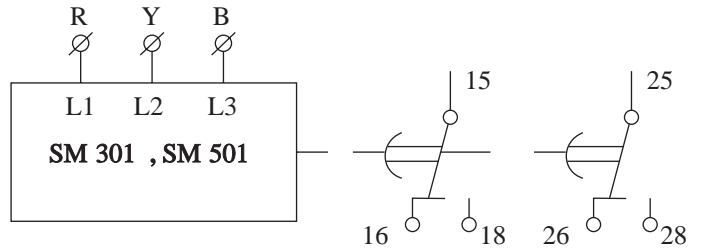
# Voltage Monitoring Series



## CONNECTION DIAGRAM

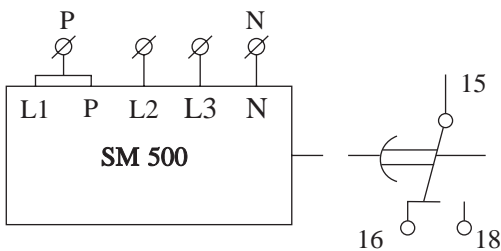


MA51BC, MA51BK, MN21D5, MK21D5, MC21D5  
MA21DN, MD21DF, MG21DH, MG21DF, MGD1DR

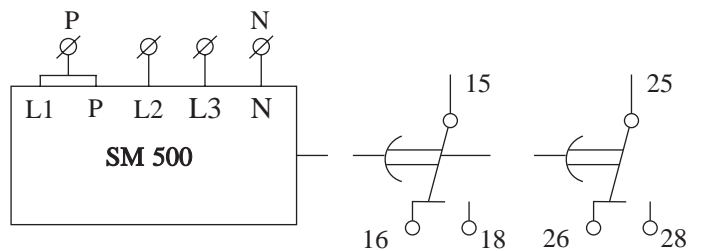


MG53BH, MG53BF, MG63BH, MG63BF  
MG53BI, MG53BO, MB53BM, MC21B5

## SINGLE PHASE

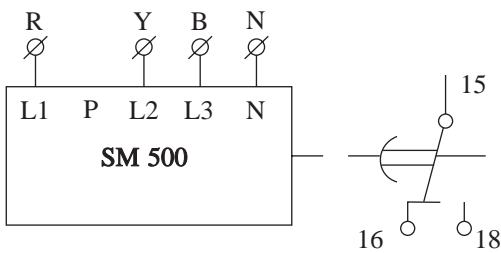


MD71BH, MD71BF, MD71B9

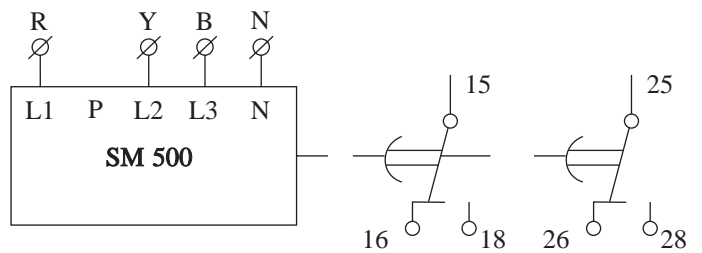


MG73BH, MG73BF, MG73B9

## THREE PHASE

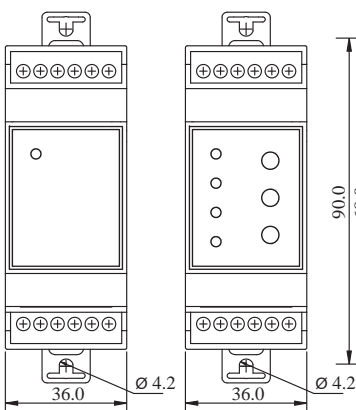


MD71BH, MD71BF, MD71B9



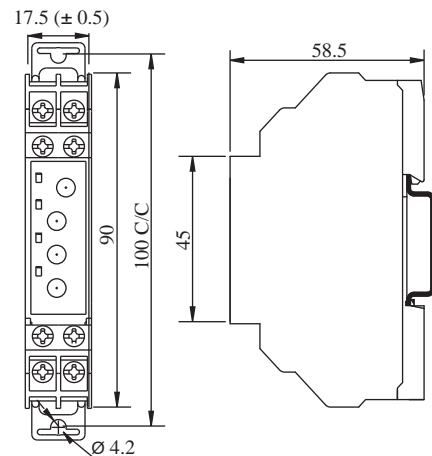
MG73BH, MG73BF, MG73B9, MAC04D0100 (P is not applicable in neutral loss)

## MOUNTING DIMENSION (mm)



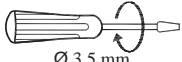

**SM 301**

**SM 500, SM 501**





**SM 175**

## TERMINAL TORQUE & CAPACITY

 Ø 3.5 mm	Torque - 0.54 N.m (5 Lb.in) Terminal screw - M2.6
	Solid Wire - 1 X 0.2...3.3 mm <sup>2</sup>
AWG	1 X 24 to 12

**SM 301, SM 500, SM 501**

 Ø 3.5...5.0 mm	Torque - 0.6 N.m (5.3 Lb.in) Terminal screw - M3.5
	Solid Wire - 2 X 0.2...2.5 mm <sup>2</sup>
AWG	1 X 24 to 10

**SM 175**