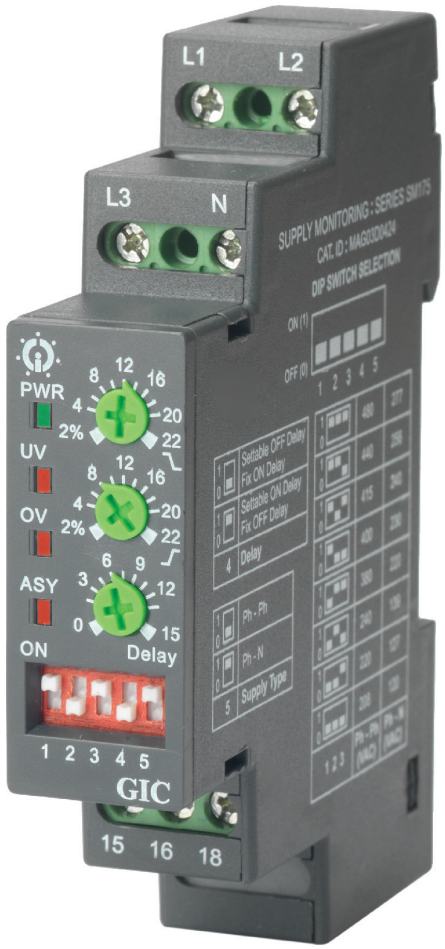
Voltage Monitoring Series SM 175

- Compact 17.5 mm Wide
- Multi-Voltage: Three Phase 3 Wire @ 208-480 VAC or Three Phase 4 Wire @ 120-277 VAC
- Can be configured for 3 Phase 3 Wire or 3 Phase 4 Wire system
- Protection against Phase loss, Phase Sequence, Phase Asymmetry, Under Voltage & Over Voltage
- Selectable Under Voltage / Over Voltage, Asymmetry and Phase Sequence
- LED Indication for all Faults & for change in dip switch settings during runtime for better security
- Adjustable ON/OFF Time Delay in seconds / minutes
- 1 C/O Configuration



Ordering Information

Cat. No.	Description
MAG03D0424	208-480 VAC, UV/OV, Phase Loss, Phase Sequence, Phase Asymmetry Monitoring, 1 C/O
MAG03D0425	415 VAC (3P, 3W) / 240 VAC (3P, 4W), UV/OV, Phase Loss, Selectable Phase Sequence, Phase Asymmetry, 1C/O
MAG03D0426	415 VAC (3P, 3W) / 240 VAC (3P, 4W),UV/OV, Selectable Phase Sequence & Phase Asymmetry, ON Delay and OFF Delay (in sec/min), 1C/O
MAG03D0427	415 VAC (3P, 3W), Phase loss Monitoring, 1 C/O

Voltage Monitoring Series SM 175

Cat. No.			MAG03D0424	MAG03D0425	MAG03D0426
Parameters					
Supply Voltage (⏚)			208 to 480 VAC (3P,3W) 120 to 277 VAC (3P,4W)	415 VAC(3P,3W) / 240 VAC(3P,4W)	
Supply Variation			+/- 23% (of ⏚)		
Frequency			50/60 Hz		
Reference Voltage			Settable	Fixed	Fixed
Trip Settings	Phase Loss		Yes	Yes	Yes
	Phase Sequence		Yes	Selectable	Selectable
	Phase Asymmetry		10% Fixed	10% Fixed	10% Fixed / 5% to 25% Settable
	Under Voltage		2% to 22% (of ⏚)	5% to 25% (of ⏚) / 60% (of ⏚) Fixed	5% to 25% (of ⏚) / 80% (of ⏚) Fixed
	Over Voltage		2% to 22% (of ⏚)	110% (of ⏚) Fixed / 5% to 25% (of ⏚)	110% (of ⏚) Fixed
	Hysterisis (Phase Asy.)		2.7% Fixed		
	Hysterisis (UV/OV)		2% Fixed	2% to 12% Settable	2.7% Fixed
Power Consumption (Max.)			16 VA @ 415 VAC		
Time Delay	ON Delay		(0 to 15 Sec) settable / 5 sec (selectable DIP switch)		(0 to 15) settable sec / min
	Trip Time (OFF Delay)		5 sec / (0 to 15 Sec) settable (selectable DIP switch)		(0 to 15) settable sec / min
			100ms max for Phase loss & Phase Sequence		
Output	Relay Output		1 C/O		
	Contact Rating		5A @ 250 VAC / 30 VDC (Resistive)		
	Electrical Life		$5X10^4$		
	Mechanical Life		$1X10^7$		
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.

	Power LED/RV (Green)	UV (Red LED)	OV (Red LED)	ASY/PR (Red LED)
Power ON	ON	OFF	OFF	OFF
Phase reverse	ON	OFF	OFF	ON
Asymmetry	ON	OFF	OFF	Slow BLINK
UV	ON	ON	OFF	OFF
OV	ON	OFF	ON	OFF
B Phase Loss	Slow BLINK	OFF	OFF	OFF
Voltage Int.	OFF	OFF	OFF	OFF

* Above mentioned LED status are considering single fault at a time. In case of multiple faults LED will glow according to their fault status.

Operating Temperature Storage Temperature	- 20°C to +60°C - 25°C to +70°C
Humidity (Non Condensing)	95% (Rh)
Enclosure	Flame Retardant UL 94-V0
Dimension (W x H x D) (in mm)	18 X 90 X 66.5
Weight (unpacked)	72 g
Mounting	Base / DIN rail
Degree of Protection	IP 20 for Terminals, IP 30 for Enclosure, IP 40 for Front side
Certification	CE RoHS Compliant

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 11
Radiated Emission	CISPR 11

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 SM 175

Selection of Function: Operating Mode & timing can be selected by using DIP switches

DIP SWITCH SELECTION

Cat. No.: MAG03D0424

1 0	480	277
1 0	440	256
1 0	415	240
1 0	400	230
1 0	380	220
1 0	240	139
1 0	220	127
1 0	208	120
1 2 3	**Ph - Ph (VAC)**	**Ph - N (VAC)**

1 0	Settable OFF Delay Fix ON Delay
1 0	Settable ON Delay Fix OFF Delay
4	**Delay**

1 0	Ph - Ph
1 0	Ph - N
5	**Supply Type**

Cat. No.: MAG03D0425

1 0	Settable UV with fix OV*
1 0	Settable OV with fix UV*
1 0	Inner Mode
1 0	Outer Mode
1 2	**Function**

1 0	Phase Seq. Disable
1 0	Phase Seq. Enable
3	**Function**

1 0	Settable OFF Delay Fix ON Delay
1 0	Settable ON Delay Fix OFF Delay
4	**Delay**

1 0	Ph - Ph
1 0	Ph - N
5	**Supply Type**

* Note : When POT - P1 is set as UV or OV through DIP S/W setting, then POT-P2 is used to set hysterisis ranging from 2% to 12%.

Cat. No.: MAG03D0426

1 0	Phase Seq. Disable
1 0	Phase Seq. Enable
1	**Function**

1 0	Settable UV(POT-P1) with fix assymetry
1 0	Settable ASY (POT-P1) with fix UV
2	**Function**

1 0	Settable (POT-P2) ON Delay in sec
1 0	Settable (POT-P2) ON Delay in min
3	**Delay**

1 0	Settable (POT-P3) OFF Delay in sec
1 0	Settable (POT-P3) OFF Delay in min
4	**Delay**

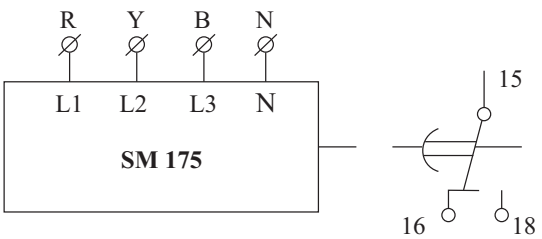
1 0	Ph - Ph
1 0	Ph - N
5	**Supply Type**

Cat. No.: MAG03D0425

Inner Mode: If user requires both UV and OV protection along with the healthy status of relay between UV and OV range then the user can set Inner mode configuration by selecting DIP switch 1 - high & 2 as low. For this setting P1 potentiometer will work as UV threshold and P2 potentiometer will work as OV threshold with fixed recovery hysteresis of 2% for both.

Outer Mode: If user requires both UV and OV protection along with the unhealthy status of relay between UV and OV range then the user can set outer configuration by selecting both DIP switches high. For this setting P1 potentiometer will work as UV threshold and P2 potentiometer will work as OV threshold with fixed recovery hysteresis of 2% for both.

CONNECTION DIAGRAM



MAG03D0424, MAG03D0425, MAG03D0426, MAG03D0427

Voltage Monitoring Series SM 175

- Compact 17.5 mm Wide
- Protects against Phase Loss, Phase Reversal & Phase Asymmetry
- Multi-Voltage: Three Phase wire @ 208 - 480 VAC
- Selectable Under Voltage / Over Voltage & Asymmetry
- LED Indication for all Faults & for change in settings during run time for better security
- Adjustable Time Delay
- 1 C/O Configuration

Ordering Information

Cat. No.	Description
MN21D5	208 - 480 VAC, Phase Loss Monitoring, 1 C/O
MK21D5	208 - 480 VAC, Phase Loss, Phase Sequence Monitoring , 1 C/O
MC21D5	208 - 480 VAC, Phase Loss, Phase Sequence, Phase Asymmetry Monitoring (30% Fixed), 1 C/O
MA21DN	208 - 480 VAC, Phase Loss, Phase Sequence, Phase Asymmetry Monitoring (5% to 15% Variable), 1 C/O
MOF1D51	208 - 480 VAC, Phase Loss, Phase Asymmetry Monitoring (10% Fixed), with trip time < 65 ms, 1 C/O

Voltage Monitoring Series SM 175

Cat. No.			MN21D5	MK21D5	MC21D5	MA21DN
Parameters						
Supply Voltage (⏚)			208 - 480 VAC, (3 Phase 3 Wire)			
Supply Variation			-12% to + 10% (of ⏚)			
Frequency			50/60 Hz			
Power Consumption (Max.)			3.5 VA			
Trip Levels	Phase Loss		Yes	Yes	Yes	Yes
	Phase Sequence		N A	Yes	Yes	Yes
	Phase Asymmetry		N A	N A	30% Fixed	5% to 15%
Time Delay	ON Delay		< 750 ms	< 750 ms	< 750 ms	5s
	Trip Time (OFF Delay)		< 65 ms	100 ms	100 ms	0.5 to 15 s (Selectable)
Output	Relay Output		1 C/O			
	Contact Rating		5A @ 250 VAC / 30 VDC (Resistive)			
	Electrical Life		$1X10^5$			
	Mechanical Life		$3X10^6$			
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		Healthy	Relay LED Continuous ON			
		Phase Reverse	N A	Relay LED Flashing		
		Asymmetry	Relay LED Off (Red Colour)	N A	Relay LED Off (Red Colour)	
Operating Temperature Storage Temperature			- 15° C to +60° C - 20° C to +80° C			
Humidity (Non Condensing)			95% (Rh)			
Enclosure			Flame Retardant UL 94-V0			
Dimension (W x H x D) (in mm)			17.5 X 90 X 58.5			
Weight (unpacked)			70 g			
Mounting			Base / DIN rail			
Degree of Protection			IP 20 for Terminal, IP 30 for Enclosure			
Certification			CE cULus LISTED RoHS Compliant			

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 SM 175

Ordering Information

Cat. No.	Description
MD21DF	208 - 480 VAC, UV / OV, Phase Loss & Sequence with Selectable OFF Delay, 1 C/O
MG21DH	208 - 480 VAC, UV / OV & SPP with Selectable ON Delay, 1 C/O
MG21DF	208 - 480 VAC, UV / OV & SPP with Selectable OFF Delay, 1 C/O
MGD1DR	208 - 480 VAC, UV / OV & SPP with Selectable ON Delay & OFF Delay, 1 C/O
MAE03D0200	115 VAC/DC or 240 VAC/DC, UV / OV with Selectable ON & OFF Delay, 1 C/O
MF31B0	220 VAC, Single Phase Under Voltage Relay
MF51B0	400 VAC, Three Phase Under Voltage Relay

UL Approval not applicable to Cat Nos. MN21D5, MOF1D51, MGD1DR, MAE03D0200, MF31B0, MF51B0

Voltage Monitoring Series SM 175

Cat. No.			MD21DF	MG21DH	MG21DF	MGD1DR
Parameters						
Supply Voltage (⏚)			208 - 480 VAC, (3 Phase 3 Wire)			400 VAC, (3 Phase 3 Wire)
Supply Variation			-12% to + 10% (of ⏚)			
Frequency			50/60 Hz			
Power Consumption (Max.)			3.5 VA			
Settable Nominal Voltage			208 - 220 - 380 - 400 - 415 - 440 - 480 VAC			N A
Trip Levels	Phase Loss		Yes			
	Phase Sequence		Yes			
	Phase Asymmetry		N A	10% Fixed		
	Under Voltage		-2% to -20% (of ⏚)	-5% to -25% (of ⏚)		
	Over Voltage		+2% to +20% (of ⏚)	+5% to +25% (of ⏚)		
Time Delay	ON Delay		5 s	0.5 to 100 s (Selectable)	5 s	0.5 to 100 s (Selectable)
	Trip Time (OFF Delay)		0.5 to 15 s (Selectable)	5 s	0.5 to 100 s (Selectable)	0.5 to 15 s (Selectable)
Output	Relay Output		1 C/O			
	Contact Rating		5A @ 250 VAC / 30 VDC (Resistive)			
	Electrical Life		$1X10^5$			
	Mechanical Life		$3X10^6$			
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		Healthy	Red LED: Supply Healthy → Continuous ON, Phase Reverse → Flashing			
		UV	Red LED: Under Voltage → Continuous ON			
		OV	Red LED: Over Voltage → Continuous ON			
		Asymmetry	Red LED: Asymmetry → Continuous ON			
		All LED's	Phase Fail or Higher Cut OFF(> 560 VAC) or lower cut off (<175 VAC), Blinking → Pot changed during running conditions			
Operating Temperature			- 15° C to +60° C			
Storage Temperature			- 20° C to +80° C			
Humidity (Non Condensing)			95% (Rh)			
Enclosure			Flame Retardant UL 94-V0			
Dimension (W x H x D) (in mm)			18 X 59 X 90			
Weight (unpacked) Approx.			70 g			
Mounting			Base / DIN rail			
Degree of Protection			IP 20 for Terminal, IP 30 for Enclosure			
Certification			CE, cULus LISTED, RoHS Compliant			

EMI / EMC

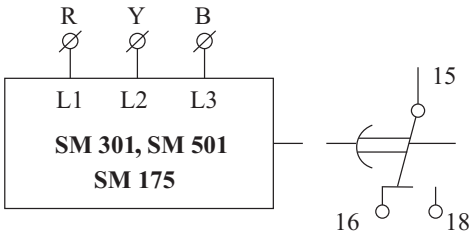
Harmonic Current Emissions	IEC 61000-3-2
ESD	IEC 61000-4-2
Radiated Susceptibility	IEC 61000-4-3
Electrical Fast Transients	IEC 61000-4-4
Surges	IEC 61000-4-5
Conducted Susceptibility	IEC 61000-4-6
Voltage Dips & Interruptions (AC)	IEC 61000-4-11
Conducted Emission	CISPR 14-1
Radiated Emission	CISPR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

Environmental

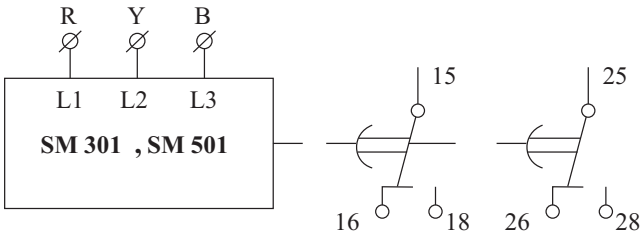
Cold Heat	IEC 60068-2-1
Dry Heat	IEC 60068-2-2
Vibration	IEC 60068-2-6
Repetitive Shock	IEC 60068-2-27
Non-Repetitive Shock	IEC 60068-2-27

Voltage Monitoring Series

CONNECTION DIAGRAM

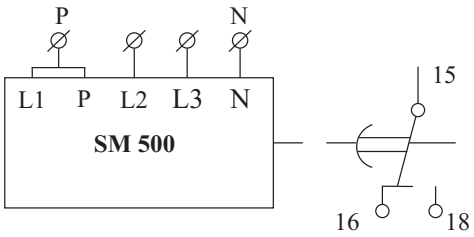


MA51BC, MA51BK, MN21D5, MK21D5, MC21D5
MA21DN, MD21DF, MG21DH, MG21DF, MGD1DR

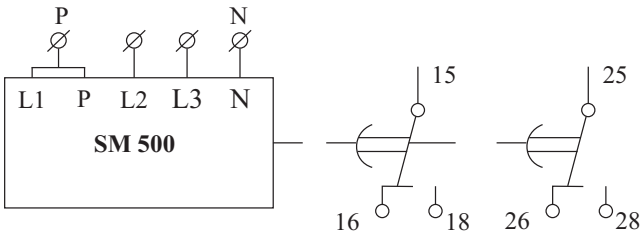


MG53BH, MG53BF, MG63BH, MG63BF
MG53BI, MG53BO, MB53BM, MC21B5

SINGLE PHASE

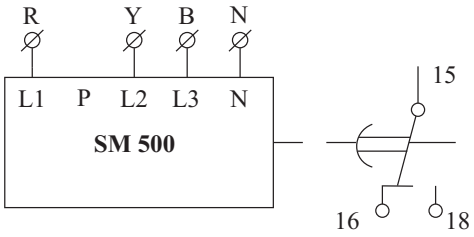


MD71BH, MD71BF, MD71B9

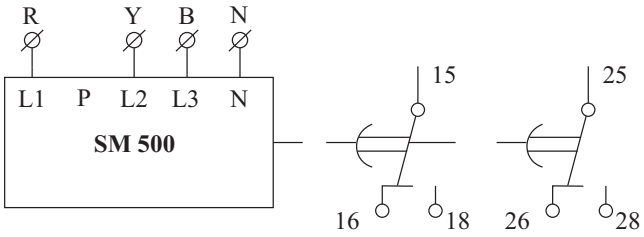


MG73BH, MG73BF, MG73B9

THREE PHASE

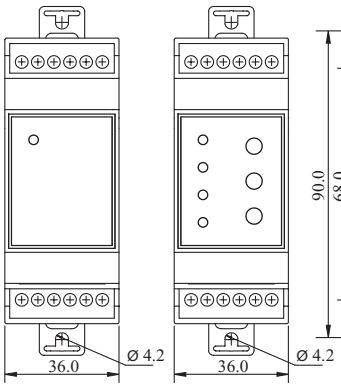


MD71BH, MD71BF, MD71B9

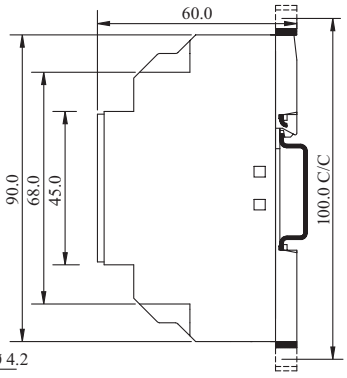


MG73BH, MG73BF, MG73B9, MAC04D0100 (P is not applicable in neutral loss)

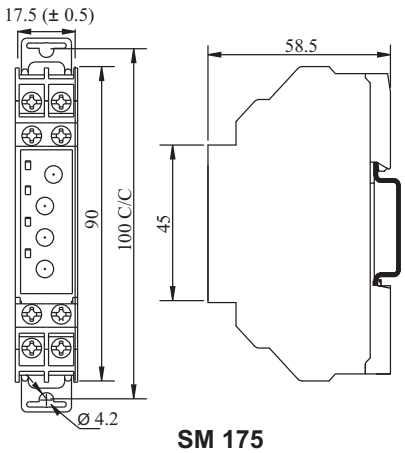
MOUNTING DIMENSION (mm)



SM 301



SM 500, SM 501



SM 175

TERMINAL TORQUE & CAPACITY

Ø 3.5	0.54 N.m (6 Lb.in)
	1 x 2.5 mm² Solid Wire/Stranded
AWG	1 x 24 to 12

SM 301, SM 500, SM 501

Ø 3.5 mm....5.0mm	0.80 N.m (7.1 Lb.in)
	2 x 2.5 mm² Solid/Stranded Wire
AWG	2 x 20 to 14

SM 175