

Voltage Monitoring Relay SM 800

- LCD Display with Green backlight
- Multi-Voltage: Three Phase 4 Wire & Three Phase 3 Wire @ 145-500 VAC
- Protection against Phase loss, Phase Sequence, Phase Asymmetry, Under Voltage, Over Voltage, Neutral Open, Over Frequency & Under Frequency
- Can be configured for 3 Phase 3 Wire or 3 Phase 4 Wire system
- Selectable Over Voltage/ Under Voltage, Asymmetry, Phase Loss, Phase Sequence, Over Frequency/ Under Frequency
- Adjustable ON/OFF Time Delay in seconds/ minutes
- 5A Single and Dual relay outputs
- Two Separate Relay outputs with independent Programming
- Password protection
- Log of 5 previous faults for better monitoring
- Fail safe/ Non-Fail safe relay output
- Latch (Manual) and Non-Latch (Auto) Modes




Ordering Information

Cat. No.	Description
DMS110	145-500 VAC, Digital Voltage Monitoring Relay, 1C/O
DMS120	145-500 VAC, Digital Voltage Monitoring Relay, 1C/O + 1C/O
DMA220	85- 300 VAC/DC, Digital Voltage Monitoring Relay with Auxiliary supply, 1C/O + 1C/O



Voltage Monitoring Relay SM 800

Cat. No.			DMS110	DMS120	DMA220
Parameters					
Supply Voltage (⎓)			145 - 500 VAC		85 - 300 VAC/DC
Frequency			45 to 65 Hz		
Trip Settings	Phase Loss		Configurable (Enable/Disable) (Default : Enable)		
	Phase Reverse		Configurable (Enable/Disable) (Default : Enable)		
	Phase Asymmetry		2 to 50%		
	Under Voltage		Phase voltage : 90 to 288 VAC		Phase voltage : 50 to 288 VAC
			Line voltage : 155 to 500 VAC		Line voltage : 85 to 500 VAC
	Under Voltage Hysteresis		3 to 20VAC +/- 2V (7V Default)		
	Over Voltage		Phase voltage : 90 to 288 VAC		Phase voltage : 50 to 288 VAC
			Line voltage : 155 to 500 VAC		Line voltage : 85 to 500 VAC
	Over Voltage Hysteresis		3 to 20VAC +/- 2V (7V Default)		
	Under Frequency		45 to 65 Hz		
	Over Frequency		45 to 65 Hz		
	Frequency Hysteresis		0.1 to 5 Hz		
Asymmetry		Voltage : 5 to 99 VAC (Default 60V)			
		Percentage : 2 to 50%			
Hysteresis for Asymmetry		Voltage : 3 to 99 VAC +/- 2V (Default 7V)			
		Percentage : 2 to 15%			
Power Consumption (Max.)			5 VA		
Time Delay	ON Delay		2sec to 999sec (Default : 5sec)		
	Trip Time (OFF Delay)		0.1 to 999sec (Phase loss & Phase reverse : <100ms) Default : Neutral Loss is <500ms & UV, OV, Asymmetry fault 5sec.		
Output	Relay Output		1 C/O	1 C/O + 1 C/O	1 C/O + 1 C/O
	Contact Rating		5A (Resistive) @ 240 VAC / 30 VDC		
	Electrical Life		1X10 ⁵ Operations		
	Mechanical Life		1X10 ⁷ Operations		
Utilization Category		AC-15	(V)	120/240 V	
			(A)	3/1.5 A	
		DC-13	(V)	24/125/250 V	
			(A)	2/0.22/0.1 A	
Operating Temperature			-10°C to + 60°C		
Storage Temperature			-20°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 67		
Weight			100 g		
Mounting			Base / DIN		
Degree of Protection			IP-20 for Enclosure & Terminals, IP-40 with Front Facia for Dust cover		
Certification			CE  RoHS Compliant		

EMI / EMC

Harmonic Current Emissions	IEC 61000-3-2
Voltage Flicker and Fluctuations	IEC 61000-3-3
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
Voltage Dips & Interruptions (DC)	IEC 61000-4-29
Conducted Emission	CISPR 11
Radiated Emission	CISPR 11
Swell	As per GTS Standard's

Environmental

Cold Heat	IEC 60068-2-1
Dry Heat	IEC 60068-2-2
Vibration	IEC 60068-2-6

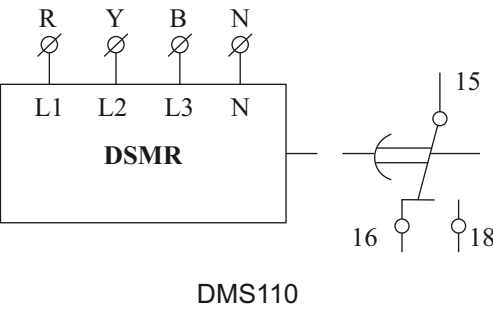
Safety:

Test Voltage Between I/P & O/P	IEC 60947-5-1 / UL 508
Test Voltage Between all Terminals & Enclosure	IEC 60947-5-1 / UL 508
Impulse Voltage Between I/P & O/P	IEC 60947-5-1

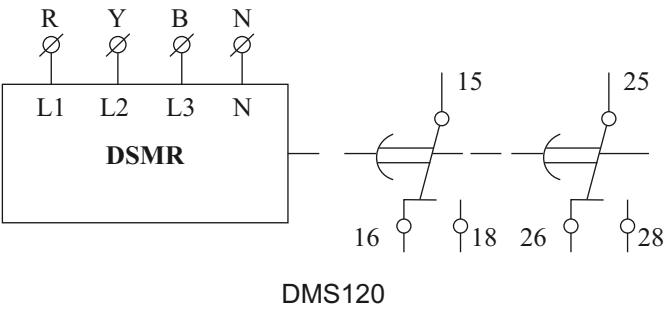
Voltage Monitoring Relay SM 800



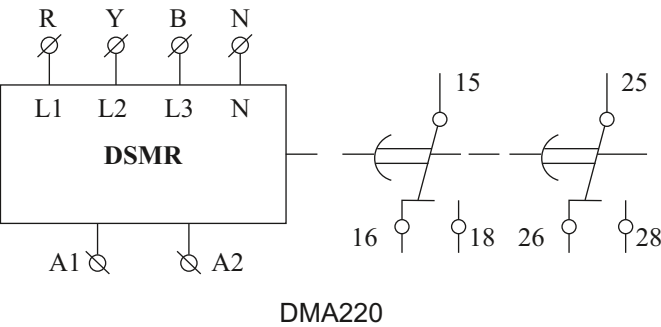
CONNECTION DIAGRAM



DMS110

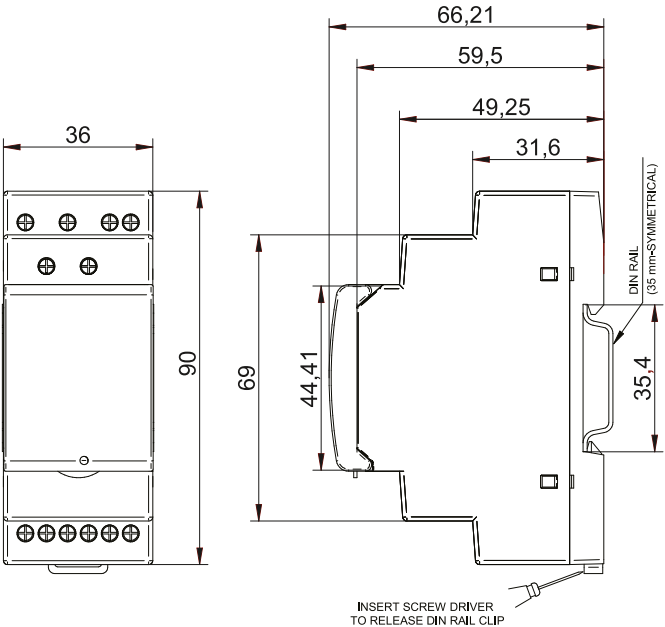


DMS120

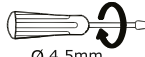



DMA220

MOUNTING DIMENSION (mm)



TERMINAL TORQUE & CAPACITY

 Ø 4.5mm	0.5 N.m (4.4 lb.in)
	1 x 4mm Solid / Standard Wire
AWG	26 to 10

Voltage Monitoring Relay 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	208-480 VAC (3P, 3W), Phase loss Monitoring, 1 C/O
MAG03D0428	208-480 VAC (3P, 3W), Phase Loss, Phase Sequence, 1C/O

Voltage Monitoring Relay SM 175



Cat. No.		MAG03D0424	MAG03D0425	MAG03D0426	MAG03D0427
Parameters					
Supply Voltage (⊕)		208 to 480 VAC (3P,3W) 120 to 277 VAC (3P,4W)	415 VAC(3P,3W) / 240 VAC(3P,4W)		208-480 VAC(3P,3W)
Supply Variation		+/- 23% (of ⊕)			
Frequency		50/60 Hz			
Reference Voltage		Settable	Fixed	Fixed	Fixed
Trip Settings	Phase Loss	Yes	Yes	Yes	Yes
	Phase Reverse	Yes	Settable through DIP S/W	Settable through DIP S/W	NA
	Phase Asymmetry	10% Fixed	10% Fixed	10% Fixed / 5% to 25% Settable	30% Fixed
	Under Voltage	2% to 22% (of ⊕)	5% to 25% (of ⊕) / 60% (of ⊕) Fixed	5% to 25% (of ⊕) / 80% (of ⊕) Fixed	NA
	Over Voltage	2% to 22% (of ⊕)	110%(of ⊕) Fixed / 5% to 25%(of ⊕)	110%(of ⊕) Fixed	NA
	Hysteresis (Phase Asy.)	2.7% Fixed			NA
	Hysteresis (UV/OV)	2% Fixed	2% to 12% Settable	2.7% Fixed	NA
Power Consumption (Max.)		16 VA @ 415 VAC			
Time Delay	ON Delay	(0 to 15 Sec) settable / 5 sec (selectable DIP switch)		(0.5 to 15) settable sec / min	<=750 msec
	Trip Time (OFF Delay)	5 sec / (0 to 15 Sec) settable (selectable DIP switch) 100ms max for Phase loss & Phase Sequence		(0.5 to 15) settable sec / min	<=500 msec
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 DC - 13	Rated Voltage (Ue): 120/240 V, Rated Current (Ie): 3.0/1.5 A 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
* 1. Multiple LEDs can operate indicating multiple faults at a time e.g. in case of phase loss, UV and phase asymmetry faults may also occur. 2. For cat id MAG03D0428, R LED ON indicates healthy supply & OFF indicates Phase loss. 3. For Outer Mode fault in MAG03D0425 product, UV and OV LED blinks@200 msec.					
Operating Temperature		- 20°C to +60°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)		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			
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 11
Radiated Emission	CISPR 11

Environmental

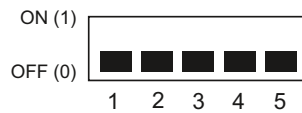
Cold Heat	IEC 60068-2-1
Dry Heat	IEC 60068-2-2
Vibration	IEC 60068-2-6



Voltage Monitoring Relay 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 hysteresis ranging from 2% to 12%.

Cat. No.: MAG03D0426

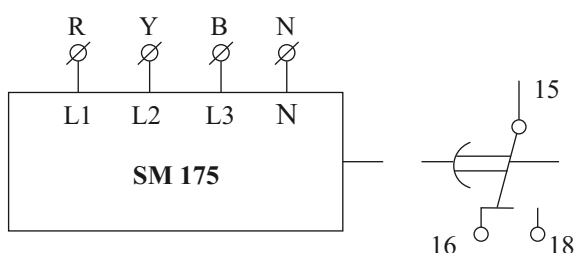
1	0		Phase Seq. Disable
1	0		Phase Seq. Enable
1			Function
1	0		Settable UV(POT-P1) with fix asymmetry
1	0		Settable ASY (POT-P1) with fix UV
2			Function
1	0		Settable (POT-P2) ON Delay in sec
1	0		Settable (POT-P2) ON Delay in min
3			Delay
1	0		Settable (POT-P3) OFF Delay in sec
1	0		Settable (POT-P3) 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, MAG03D0428

Voltage Monitoring Relay SM 175

- Compact 17.5 mm Wide
- Protects against Phase Loss, Phase Reversal & Phase Asymmetry
- Multi-Voltage: Three Phase Three 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



Voltage Monitoring Relay 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 VA			
Trip Levels	Phase Loss	Yes	Yes	Yes	Yes
	Phase Sequence	N A	Yes	Yes	Yes
	Phase Asymmetry	30% Fixed	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		- 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 58.5 x 90			
Weight (unpacked)		70 g			
Mounting		Base / DIN rail			
Degree of Protection		IP 20 for Terminal, IP 30 for Enclosure			
Certification		<div><div></div><div></div><div></div></div>			

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 Relay 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
MG21D2	415 VAC, fix UV / OV with fix ON Delay & OFF Delay, 1C/O
MAE03D0200	240 VAC/DC, UV / OV with Selectable ON & OFF Delay, 1 C/O
MAE03D0202	115 VAC/DC, UV / OV with Selectable ON & OFF Delay, 1 C/O
MF41B0	230 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, MF41B0, MF51B0

Voltage Monitoring Relay SM 175



Cat. No.		MD21DF	MG21DH	MG21DF	MGD1DR
Parameters					
Supply Voltage (Φ)		208 - 480 VAC, (3 Phase 3 Wire)			400 VAC, (3 Phase 3 Wire)
Supply Variation		-12% to + 10% (of Φ)			
Frequency		50/60 Hz			
Power Consumption (Max.)		3 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 Φ)	-5% to -25% (of Φ)		
	Over Voltage	+2% to +20% (of Φ)	+5% to +25% (of Φ)		
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 90 X 58.5			
Weight (unpacked) Approx.		70 g			
Mounting		Base / DIN rail			
Degree of Protection		IP 20 for Terminal, IP 30 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 Relay SM 301

- Protects against Phase Loss, Phase Reversal & Phase Asymmetry
- No Auxiliary Supply needed
- Voltage Sensing principle
- 1 C/O & 2 C/O Configurations
- Designed to meet Industrial and Agricultural segment applications



Ordering Information

Cat. No.

MA51BC

MA51BK

MC21B5

MA59B5

Description

415 VAC, Single Phasing Preventor with 65 VAC Asymmetry, 1 C/O



415 VAC, Single Phasing Preventor with 40 VAC Asymmetry, 1 C/O

415 VAC, Single Phasing Preventor with 65 VAC Asymmetry, 2 C/O

415 VAC, Phase Loss Monitoring with Non Fail Safe Type, 1 C/O

Voltage Monitoring Relay SM 301



Cat. No.		MA51BC	MA51BK	MC21B5
Parameters				
Supply Voltage (⚡)		415 VAC		
Frequency		50/60 Hz		
Power Consumption (Max.)		15 VA		
Trip Settings	Phase Loss	Yes	Yes	Yes
	Phase Sequence	Yes	Yes	Yes
	Phase Asymmetry	65 V (± 10V)	40 V (± 10 V)	65 V (± 10V)
	Hysteresis	10 to 18 V	10 to 18 V	10 to 18 V
Time Delay	ON Delay	2 s (± 2 s)	2 s (± 2 s)	< 550 ms
	Trip Time (OFF Delay)	7 s (± 2 s)	7 s (± 2 s)	< 550 ms
Output	Relay Output	1 C/O	1 C/O	2 C/O
	Contact Rating	5A (For 'NO') & 3A (For 'NC') @ 250 VAC / 28 VDC (Resistive)		5A @ 250 VAC / 28 VDC (Resistive)
	Electrical Life	1X10 ⁵		
	Mechanical Life	3X10 ⁶		
Utilization Category	AC - 15	Rated Voltage (U _e): 120/240 V, Rated Current (I _e): 3.0/1.5 A		
	DC - 13	Rated Voltage (U _e): 24/125/250 V, Rated Current (I _e): 2.0/0.22/0.1 A		
LED Indication		Red → Relay ON (Healthy), See Note 1		
Operating Temperature		- 15° C to + 50° C		
Storage Temperature		- 20° C to + 65° 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		IP20 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

Note 1:- ON: Relay ON, OFF: Phase Loss, Blinking: Asymmetry (200 ms, On/Off), Flashing: Phase Sequence (1 s, On/Off)

Voltage Monitoring Relay 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 Relay SM 500



Cat. No.		MD71BH	MD71BF	MD71B9
Parameters				
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 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		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 60 X 90		
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 Relay 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
MG73BF	240 VAC, UV / OV & SPP with Selectable OFF Delay (0.5 to 15 sec), 2 C/O
MG73BQ	120 - 240 VAC Selectable, UV / Selectable OV & SPP with Selectable OFF Delay (0.5 to 15 sec), 2 C/O
MG73BR	240 VAC, Fixed UV / OV & SPP, 20% Asymmetry with Fixed ON (10 sec) & OFF (5 sec) Delay, 2 C/O
MGH3BH	220 VAC, UV / OV & SPP with Selectable ON Delay (0.5 to 15 sec), 2 C/O
MGH3BF	220 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 Relay SM 500



Cat. No.		MG73BH	MG73BF	MG73B9
Parameters				
Supply Voltage (φ)		240 VAC (1 Phase & 3 Phase, 4 Wire)		
Frequency		50/60 Hz		
Power Consumption (Max.)		4 VA (Max)		
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 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		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 60 X 90		
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 Relay SM 500 - 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.	Description
MAC04D0100	415 VAC, Neutral Loss Protection with Phase and Voltage Control, 2 C/O
MAC04D0119	380 VAC, Neutral Loss Protection with Phase and Voltage Control, 2 C/O
MAC04D0121	415VAC, Neutral Loss Protection with Phase & Voltage Control, Phase reverse disable, 2C/O
MAC04D0123	Selectable reference voltage (220-480VAC), Neutral Loss Protection with Phase & Voltage Control, 2C/O

Voltage Monitoring Relay SM 500 - 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)				
	Hysterisis	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 @ 240 VAC / 28 VDC (Resistive)				
	Electrical Life	1X10 ⁵				
	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	Power ON	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	
		ON	OFF	OFF	OFF	
		ON	OFF	OFF	ON	
		ON	OFF	OFF	BLINK	
		ON	ON	OFF	OFF	
		ON	OFF	ON	OFF	
		BLINK	OFF	OFF	OFF	
		BLINK	ON	OFF	BLINK	
		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 Relay SM 501

- Protects against Phase Loss, Phase Reversal & Phase Asymmetry
- Suitable for 3 Phase 3 Wire system
- Selectable Under Voltage / Over Voltage Trip level
- Selectable Time Delay
- Models for Selectable Phase Asymmetry
- LED Indications for Power and Fault conditions
- Voltage Sensing Principle
- 2 C/O Configuration



Ordering Information

Cat. No.	Description
MG53BH	415 VAC, UV / OV & Single Phasing Preventor (SPP) with Selectable ON Delay (0.5 to 15 sec), 2 C/O
MG53BF	415 VAC, UV / OV & SPP with Selectable OFF Delay (0.5 to 15 sec), 2 C/O
MG63BH	220 VAC, UV / OV & SPP with Selectable ON Delay (0.5 to 15 sec), 2 C/O
MG63BF	220 VAC, UV / OV & SPP with Selectable OFF Delay (0.5 to 15 sec), 2 C/O

Voltage Monitoring Relay SM 501



Cat. No.		MG53BH	MG53BF	MG63BH	MG63BF	
Parameters						
Supply Voltage (φ)		415 VAC (3 Phase, 3 Wire)		220 VAC (3 Phase, 3 Wire)		
Frequency		50/60 Hz				
Power Consumption (Max.)		10 VA		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)				
Hysterisis		7 V (± 2 V) of Trip Voltage				
Time Delay	ON Delay	0.5 to 15 s (Selectable)		5 s	0.5 to 15 s (Selectable)	5 s
	Trip Time (OFF Delay)	5 s	0.5 to 15 s (Selectable)		5 s	0.5 to 15 s (Selectable)
Output	Relay Output	2 C/O				
	Contact Rating	5A @ 250 VAC / 28 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		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		<div><div>CE</div><div>RoHS Compliant</div></div>				

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 Accuracy: ± 5 % of Full Scale; Time Setting Accuracy: ± 10 % of Full Scale

2) In the event of Phase Sequence or Phase Loss, OFF Delay is 100 ms

Voltage Monitoring Relay SM 501



Ordering Information

Cat. No.	Description
MG53BI	415 VAC, UV / OV & Single Phasing Preventor (SPP) with 65 V Asymmetry, 2 C/O
MG53BO	415 VAC, UV / OV & SPP with 3 min ON Delay & 5s OFF Delay, 2 C/O
MB53BM	415 VAC, UV / OV (110% Fixed) & SPP with Selectable Asymmetry (5% to 17%), 2 C/O
MG53BQ	415 VAC, UV / OV & SPP with 30 V Asymmetry, 3 Sec ON Delay, 2 C/O

Voltage Monitoring Relay SM 501



Cat. No.		MG53BI	MG53BO	MB53BM
Parameters				
Supply Voltage (ϕ)		415 VAC (3 Phase, 3 Wire)		
Frequency		50/60 Hz		
Power Consumption (Max.)		10 VA		
Trip Settings	Phase Loss	Yes	Yes	Yes
	Phase Sequence	Yes	Yes	Yes
	Phase Asymmetry	65 V	10%	5% to 17%
	Under Voltage	55% to 95% (of ϕ)	85% (of ϕ) Fixed	80% (of ϕ) Symmetrical
	Over Voltage	105% to 125% (of ϕ)	110% (of ϕ) Fixed	110% Fixed
	Hysteresis	7 V (\pm 2 V) of Trip Voltage	7 V (\pm 2 V) of Trip Voltage	7 V (\pm 2 V) of Input Voltage
Time Delay	ON Delay	5 s	3 min	0.5 to 15 s (Selectable)
	Trip Time (OFF Delay)	5 s	5 s	0.5 to 15 s (Selectable)
Output	Relay Output	2 C/O		
	Contact Rating	5A @ 250 VAC / 28 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		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 Accuracy: \pm 5 % of Full Scale; Time Setting Accuracy: \pm 10 % of Full Scale

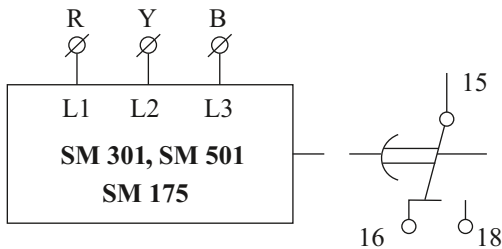
2) In the event of Phase Sequence or Phase Loss, OFF Delay is 100 ms

3) MG53BQ does not detect Phase Sequence Fault

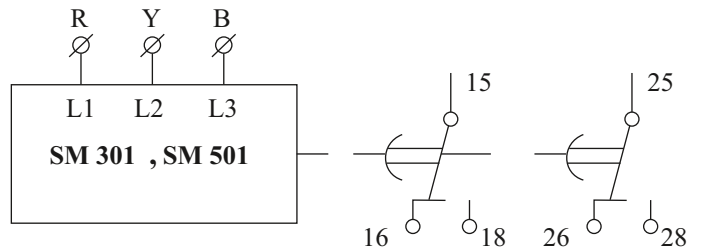
Voltage Monitoring Relay



CONNECTION DIAGRAM

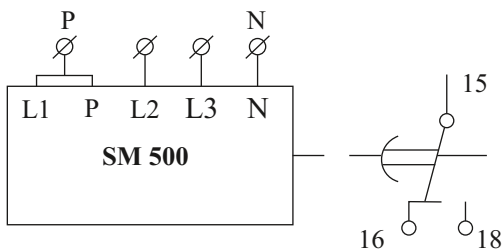


MA51BC, MA51BK, MN21D5, MK21D5, MC21D5
MA21DN, MD21DF, MG21DH, MG21DF, MGD1DR

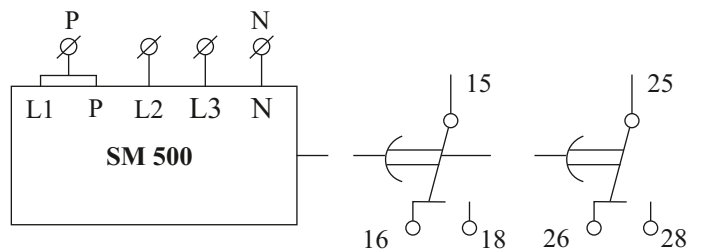


MG53BH, MG53BF, MG63BH, MG63BF
MG53BI, MG53BO, MB53BM, MC21B5

SINGLE PHASE

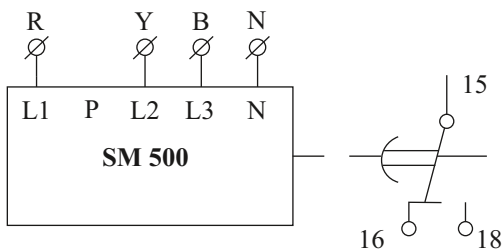


MD71BH, MD71BF, MD71B9

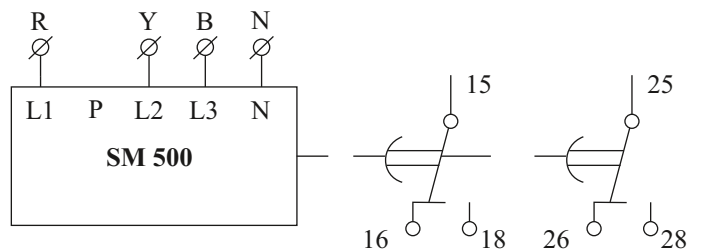


MG73BH, MG73BF, MG73B9

THREE PHASE

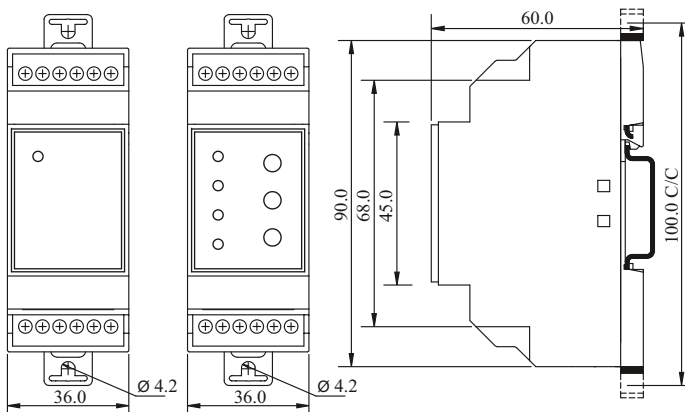


MD71BH, MD71BF, MD71B9



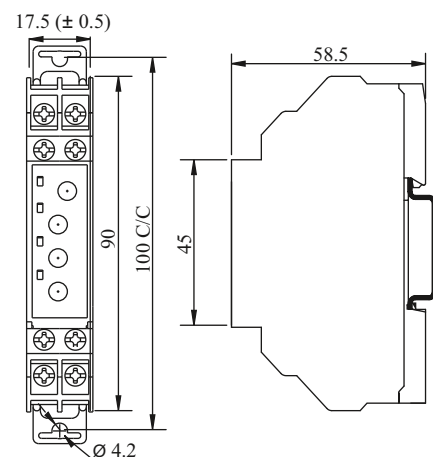
MG73BH, MG73BF, MG73B9, MAC04D0100 (P is not applicable in neutral loss)

MOUNTING DIMENSION (mm)



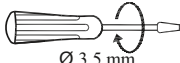

SM 301

SM 500, SM 501

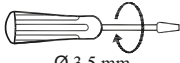



SM 175

TERMINAL TORQUE & CAPACITY

 Ø 3.5 mm	0.54 N.m (5 Lb.in) Terminal Screw - M2.6
	1 x 0.2...3.3 mm ² Solid Wire
AWG	1 x 24 to 12

SM 301, SM 500, SM 501

 Ø 3.5 mm	Torque-0.4 N.m (3.6 Lb.in) Terminal Screw - M3
	1 x 2.5 mm ² Solid/Stranded Wire
AWG	1 x 24 to 12

SM 175

Voltage Monitoring Relay SM 600

- True RMS Measurement
- Wide supply monitoring range from 500V-1000V AC
- Monitors own supply and detects fault conditions on one or more phases
- Protection against Phase loss, Phase Sequence, Phase Asymmetry, Under Voltage(UV), Over Voltage (OV) and 3 phase interruption
- Adjustable UV, OV and Phase asymmetry trip settings through Potentiometer
- LED Indication for supply and fault status
- Selectable ON or OFF delay through DIP Switch and adjustable delay time settings through Potentiometer
- Two SPDT relay outputs which can be configured separately for UV and OV fault through DIP Switch



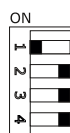
Ordering Information

Cat. No.	Description
SMB110	500-1000V AC, Measuring and Monitoring Relay, 1C/O + 1C/O



Voltage Monitoring Relay SM 600

Cat. No.	SMB110
Supply Characteristics	
Power Supply Type	Self-Powered
Supply Voltage range	Line Voltage 500V to 1000V AC
Frequency	45Hz to 65Hz
Power consumption	Max 35VA at 750V, 50Hz
Measurement Characteristics	
Monitoring signals	R, Y, B
Reference voltage (Vref)	750V line voltage
Measuring Voltage Range	500V to 1000VAC
Measuring Frequency Range	45Hz to 65Hz
Relay Output Characteristics	
Number of Relays	2 nos. of 1 C/O relays
Contact arrangement (configurable)	1 x 2 C/O (SPDT) contacts 2 x 1 C/O (SPDT) contacts
Contact rating	NO - 8A @240VAC/ 30VDC NC - 8A @240VAC/30VDC
Mechanical Life	1 × 10 ⁷ Operations
Electrical Life	1 × 10 ⁵ Operations
Utilization Category	AC-15 3A @240VAC DC-13 0.22A @125VDC & 0.1A @250 VDC
Potentiometer	
No. of Potentiometer	4
Under-Voltage (UV)	Setting of UV threshold
Over-Voltage (OV)	Setting of OV threshold
Time	Setting of Delay (Delay type setting using DIP Switch)
Asymmetry	Setting of Asymmetry
Note: Run-time Potentiometer setting is applicable	
DIP Switches	



Switch 1 - Potentiometer Delay type

OFF Position = OFF Delay (Trip Delay)

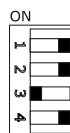
ON Position = ON Delay (Recovery Delay)



Switch 2 - Fixed Delay

OFF Position = Instantaneous (<500msec)

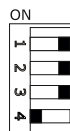
ON Position = 5 Sec



Switch 3- Delay Multiplier

OFF Position = 1

ON Position = 0.1 (Applicable to OFF delay only)



Switch 4 - Output Relay Selection (1x2 C/O SPDT or 2x1 C/O SPDT)

OFF Position = 1x2 C/O (Relay 1&2 are assigned for all faults)

ON Position = 2x1 C/O (Relay 1 is assigned for UV)

(Relay 2 is assigned for OV)

Both relay for asymmetry / phase fail / phase reverse and interruption fault.

Note: 1. Run-time dip switch setting is applicable

2. After dip switch settings are changed LED's will blink for 3 times as mentioned in LED indication table



Voltage Monitoring Relay SM 600

Feature Characteristics	
Monitoring Functions	
Monitored Voltage	Phase to Phase (3 Phase 3 Wire)
Under Voltage (Asymmetrical)	
Settable Threshold Range (Potentiometer 1)	-2 to -22 % (735V to 585V of Vref)
Setting resolution	2.00%
Hysteresis	Fixed 1 % of Vref for -2% trip setting Fixed 2 % of Vref above -2 % trip setting
Over Voltage (Asymmetrical)	
Settable threshold Range (Potentiometer 2)	2 to 22 % (765V to 915V of Vref)
Setting resolution	2.00%
Hysteresis	Fixed 1 % of Vref for 2% trip setting Fixed 2 % of Vref above 2 % setting
Asymmetry (%)	
Asymmetry Setting Range	2% to 22% Potentiometer settable
Asymmetry Hysteresis	1% for 2% Asymmetry setting. 2% for greater than 2% Asymmetry setting.
Lower voltage cut-off	-30% of Ref Vtg = 525V Asymmetrical
Higher voltage cut-off	+30% of Ref Vtg = 975V Asymmetrical
Phase loss	Yes
Phase sequence	Yes
3 phase Interruption	32 ms +/-1ms
Timing Functions:	
Power ON Delay	Fixed at 5 Sec
Delay	Potentiometer Settable. Delay Type settable using DIP Switch 1
Range	0.1 - 30 Sec. Multiplying factor settable using DIP switch applicable to OFF delay only. Markings – 1, 3, 6, 9, 12, 15, 18, 21, 24, 27, 30
ON Delay (for all faults)	Potentiometer settable 1 - 30 Sec OR Fixed using DIP Switch 1
OFF Delay	
UV/OV / Asymmetry	Potentiometer settable 0.1 - 30 Sec OR Fixed using DIP Switch 1
Phase loss	< 100 ms
Phase Reversal	< 100 ms
Phase Interruption	< 100 ms
Low voltage and High voltage cut off	<= 500 ms
Setting Accuracy	
UV, OV and Asymmetry threshold	+/- 1% of set value
ON delay and OFF delay time	+/-1% of set value
Measurement Accuracy	
Voltage	
Accuracy within supply voltage range	+/- 2% of set value
Accuracy within temperature range	+/- 0.05 % / °C of set value
Time	+/- (100ms + 1% of set value)
Repeat accuracy	+/- 0.5%

Voltage Monitoring Relay SM 600



LED Indications

Conditions	Power LED	UV LED	OV LED	ASY/ PR LED
Healthy	ON	OFF	OFF	OFF
UV	ON	ON	OFF	OFF
OV	ON	OFF	ON	OFF
Asymmetry	ON	OFF	OFF	Slow Blink (1000ms)
R-Phase Fail	Slow Blink (1000ms)	OFF	OFF	OFF
Phase Reverse	ON	OFF	OFF	ON
Low Cut Off	ON	Slow Blink (1000ms)	OFF	OFF
High Cut Off	ON	OFF	Slow Blink (1000ms)	OFF
Interruption	ON	Fast Blink (200ms)	Fast Blink (200ms)	Fast Blink (200ms)
Dip Switch Change	ON	Fast Blink (400ms)	Fast Blink (400ms)	Fast Blink (400ms)
1) During delay respective LED blinks @ 200ms. 2) During device power on delay; Power LED is ON & other LED's blink fast @ 400ms in sequence one after another.				

Environmental Parameters	
Operating Temperature	-25 °C to 70 °C
Storage Temperature	-40 °C to 85 °C
Humidity	95% RH (Without condensation)
Altitude	< 2000 meters
Pollution Degree	3
Over voltage category	III
Mechanical Parameters	
Operating Mode	Continuous operation
Degree of protection	
Enclosure / Internal Components	IP 40
Terminals	IP 20
Housing	UL94-00
Mounting	Din rail
Mounting position	any
Dimensions (L X W X D) in mm	85.5 x 45 x 100
Weight (Unpacked)	Aprox. 300 gm

Voltage Monitoring Relay SM 600



EMI / EMC Test

Harmonic Current Emissions	IEC 61000-3-2
Voltage Flicker and Fluctuations	IEC 61000-3-3
ESD	IEC 61000-4-2
Radiated Susceptibility	IEC 61000-4-3
Electrical Fast Transients	IEC 61000-4-4
Surge	IEC 61000-4-5
Conducted Susceptibility	IEC 61000-4-6
Power Frequency Magnetic Field	IEC 61000-4-8
Voltage Dips & Interruptions (AC)	IEC 61000-4-11
Conducted Emission	EN50155:2017, EN50121-3-2 and EN55011
Radiated Emission	EN50155 and EN50121-3-2/EN6100-6-4, EN55011
Harmonic immunity	Upto 30th Harmonics
Supply variations	EN50155
Supply Over voltage	EN50155

Safety test

Voltage Withstand test (Dielectric Strength)

a) Test Voltage between I/P and O/P	IEC 60255-27
b) Test Voltage between all terminals and enclosure	IEC 60255-27
Rated Impulse Voltage between I/P and O/P	IEC60255-27
Rated Impulse voltage between O/P1 and O/P2	IEC60255-27
Insulation resistance	IEC 60255-27
a) between input and output	
b) between all terminals and enclosure	
Leakage current	<3.5mA UL508
Single Fault test	The equipment shall not present a risk of electric shock or fire after a single fault test. It does not have to be functional after the test.

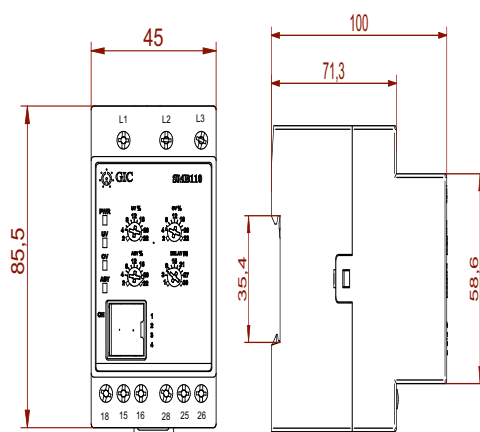
Environmental Testing

Cold Heat	IEC 60068-2-1
Dry Heat	IEC 60068-2-2,
Damp heat, cyclic	IEC 60068-2-30
Vibration, Shock and bump	EN50155 and EN61373

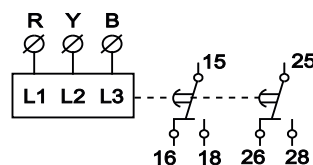
Approvals

CE, RoHS

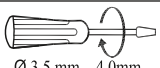

MOUNTING DIMENSION (mm)



CONNECTION DIAGRAM



TERMINAL TORQUE & CAPACITY

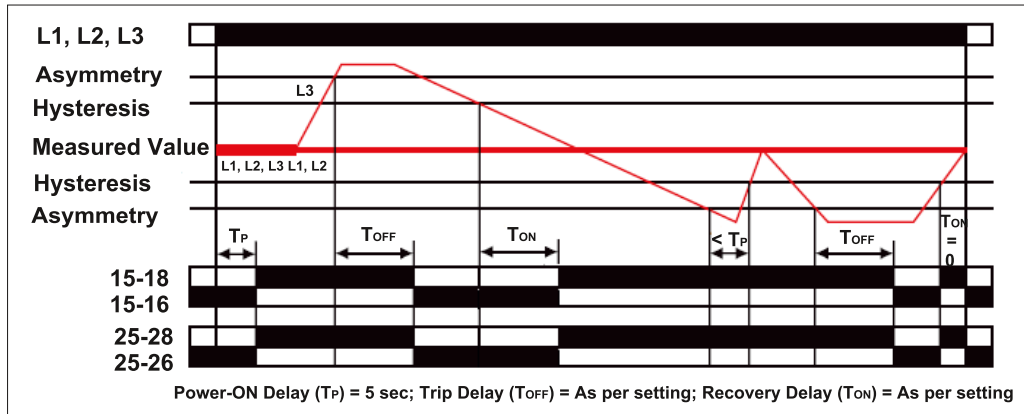
 Ø 3.5 mm...4.0mm	0.6 N.m (5.3 Lb.in)
	1 x 4.0 mm ² Solid Wire
AWG	1 x 20 to 10

Voltage Monitoring Relay SM 600

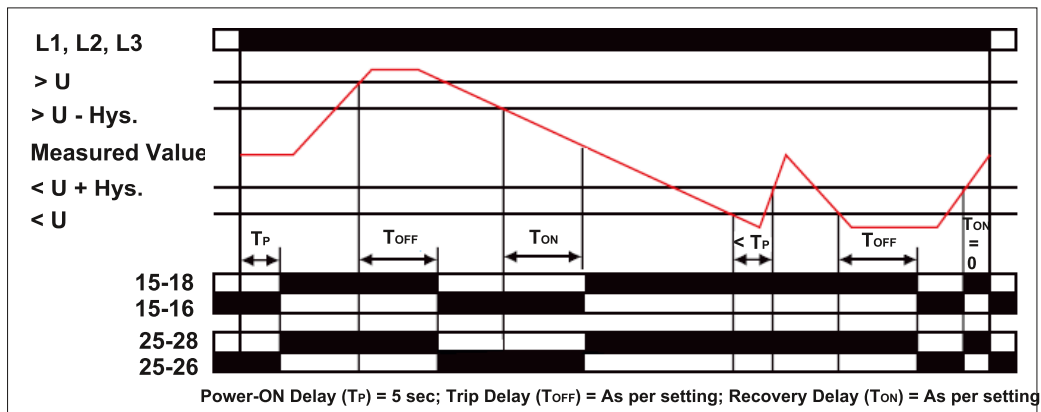


FUNCTION DIAGRAM

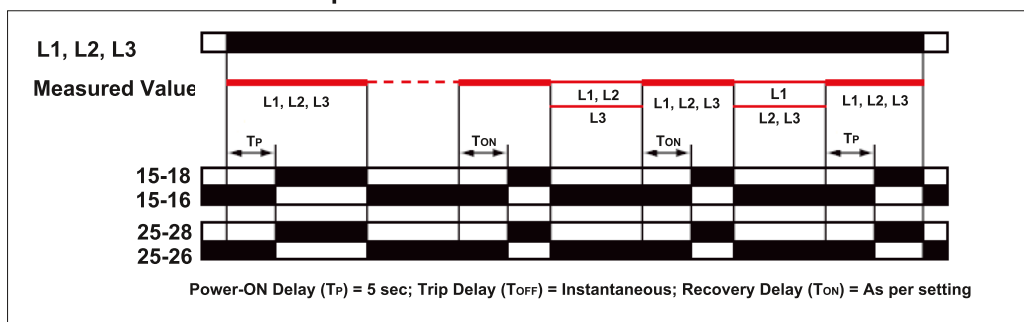
Asymmetry -



UV & OV -



Phase Fail & Phase Sequence -



Product Selection Chart: Voltage Monitoring

Cat. No.	3P - 3W	3P - 4W	1 - Phase	Under Voltage	Over Voltage	Phase Loss	Phase Sequence	Phase Asymmetry	Settable ON Delay	Settable OFF Delay	1 C/O Relay Output	2 C/O Relay Output	1 C/O+ 1 C/O Relay Output	Neutral Loss	115 VAC	208 to 480 VAC	240 VAC	415 VAC	145 to 500 VAC	500 to 1000 VAC	Auxiliary Supply
MAG03D0424																					
MAG03D0425	●	●		●	●	●	●	●	●	●	●					●					
MAG03D0426																					
MAG03D0427	●					●		●			●					●					
MAG03D0428	●					●	●				●					●					
DMS110*	●	●		●	●	●	●	●	●	●	●			●		●			●		
DMS120*	●	●		●	●	●	●	●	●	●			●	●		●			●		
DMA220*	●	●		●	●	●	●	●	●	●			●	●		●					●
MN21D5	●					●		●			●					●					
MK21D5	●					●	●				●					●					
MC21D5	●					●	●	●			●					●					
MA21DN	●					●	●	●		●	●					●					
MD21DF	●			●	●	●	●			●	●					●					
MG21DH	●			●	●	●	●	●	●		●					●					
MG21DF	●			●	●	●	●	●		●	●					●					
MOF1D51	●					●		●			●					●					
MAE03D0200			●	●	●				●	●	●				●		●				
MA51BC	●					●	●	●			●							●			
MA51BK	●					●	●	●			●							●			
MC21B5	●					●	●	●				●						●			
MD71BH		●	●	●	●	●			●		●						●				
MD71BF		●	●	●	●	●				●	●						●				
MD71B9		●	●	●	●	●		●	●		●						●				
MG73BH		●	●	●	●	●	●	●	●			●					●				
MG73BF		●	●	●	●	●	●	●		●		●					●				
MG73BR		●	●	●	●	●	●	●		●		●					●				
MG73B9		●	●	●	●	●	●	●	●		●						●				
MAC04D0100		●		●	●	●	●	●			●			●				●			
MG53BH	●			●	●	●	●	●	●		●							●			
MG53BF	●			●	●	●	●	●		●		●						●			
MG53BT	●			●	●	●	●	●		●		●						●			
MG53BQ	●			●	●	●		●		●		●						●			
MG53BI	●			●	●	●	●	●				●						●			
MG53BO	●			●	●	●	●	●				●						●			
MB53BM	●			●	●	●	●	●	●	●		●						●			
SMB110	●			●	●	●	●	●	●	●			●							●	

NOTE : 1. The product can be made available in 120 VAC, 220 VAC, 230 VAC and 400 VAC.

2. “*” DMS110/ DMS120/ DMA220 with LCD Display.