

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	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 Series 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)		(0.5 to 15) settable sec / min	<=500 msec	
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)	R LED ON indicates healthy supply & OFF indicates Phase loss
	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

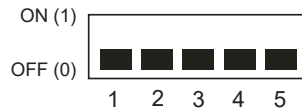
Cold Heat	IEC 60068-2-1
Dry Heat	IEC 60068-2-2
Vibration	IEC 60068-2-6

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

DIP SWITCH SELECTION



Cat. No.: MAG03D0424

1	<input type="checkbox"/>	480	277
1	<input type="checkbox"/>	440	256
1	<input type="checkbox"/>	415	240
1	<input type="checkbox"/>	400	230
1	<input type="checkbox"/>	380	220
1	<input type="checkbox"/>	240	139
1	<input type="checkbox"/>	220	127
1	<input type="checkbox"/>	208	120
1 2 3	<input type="checkbox"/>	Ph - Ph (VAC)	Ph - N (VAC)
1	<input type="checkbox"/>	Settable OFF Delay	Fix ON Delay
1	<input type="checkbox"/>	Settable ON Delay	Fix OFF Delay
4	<input type="checkbox"/>	Delay	
1	<input type="checkbox"/>	Ph - Ph	
1	<input type="checkbox"/>	Ph - N	
5	<input type="checkbox"/>	Supply Type	

Cat. No.: MAG03D0425

1	<input type="checkbox"/>	Settable UV with fix OV*
1	<input type="checkbox"/>	Settable OV with fix UV*
1	<input type="checkbox"/>	Inner Mode
1	<input type="checkbox"/>	Outer Mode
1 2	<input type="checkbox"/>	Function
1	<input type="checkbox"/>	Phase Seq. Disable
1	<input type="checkbox"/>	Phase Seq. Enable
3	<input type="checkbox"/>	Function
1	<input type="checkbox"/>	Settable OFF Delay
1	<input type="checkbox"/>	Fix ON Delay
1	<input type="checkbox"/>	Settable ON Delay
1	<input type="checkbox"/>	Fix OFF Delay
4	<input type="checkbox"/>	Delay
1	<input type="checkbox"/>	Ph - Ph
1	<input type="checkbox"/>	Ph - N
5	<input type="checkbox"/>	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

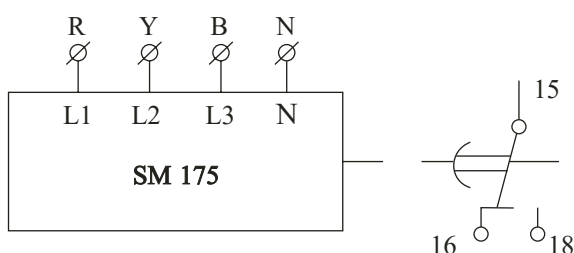
1	<input type="checkbox"/>	Phase Seq. Disable
1	<input type="checkbox"/>	Phase Seq. Enable
1	<input type="checkbox"/>	Function
1	<input type="checkbox"/>	Settable UV(POT-P1) with fix assymetry
1	<input type="checkbox"/>	Settable ASY (POT-P1) with fix UV
2	<input type="checkbox"/>	Function
1	<input type="checkbox"/>	Settable (POT-P2) ON Delay in sec
1	<input type="checkbox"/>	Settable (POT-P2) ON Delay in min
3	<input type="checkbox"/>	Delay
1	<input type="checkbox"/>	Settable (POT-P3) OFF Delay in sec
1	<input type="checkbox"/>	Settable (POT-P3) OFF Delay in min
4	<input type="checkbox"/>	Delay
1	<input type="checkbox"/>	Ph - Ph
1	<input type="checkbox"/>	Ph - N
5	<input type="checkbox"/>	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 Series 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






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 (ϕ)		208 - 480 VAC, (3 Phase 3 Wire)			
Supply Variation		-12% to + 10% (of ϕ)			
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		  			

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	240 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 Series 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