

# SUPPLY MONITORING DEVICE

## Ordering Catalog Nos.:

MAG03D0424  
MAG03D0425  
MAG03D0426  
MAG03D0427



## OPERATION:

The product operates in healthy condition, when all 3 phases with neutral (as per supply type) are present, phase sequence is correct and phase-phase voltage levels are within the set limits. If one or more phase-phase or phase-neutral voltage exceeds the upper set level (OV) or drops below the lower set level (UV), then the respective fault LED turns on and output relay trips after set OFF delay time. If phase sequence is incorrect or if L3 phase is lost, the output relay trips immediately.

## FEATURES:

- True RMS measurement
- Configurable for 3 Phase 3 Wire or 3 Phase 4 Wire supply
- Monitors own supply and detects fault conditions on one or more phases Protection against Under Voltage (UV), Over Voltage (OV), Phase Asymmetry, Incorrect phase sequence, Phase loss and 3 phase interruption
- Selectable supply voltage through DIP S/W and adjustable UV, OV or Phase asymmetry trip settings through pot in selected cat ids
- Selectable ON or OFF delay through DIP S/W and adjustable delay time settings through pot
- LED indication for supply and fault status
- 1 SPDT relay output
- 17.5mm DIN-rail housing

## CAUTION:

- Do not touch the terminals while power is being supplied.
- Tighten terminal screws with the specified torque.
- Always follow instructions stated in product leaflet.
- Before installation, check to ensure that specifications agree with intended application.
- During installation, keep 10mm distance on both sides of product from adjacent devices.
- Suitable dampers should be provided in the event of excessive vibrations.
- Only qualified persons are authorized to install the product.
- Use slow blow fuse of 250mA rating in series with product supply.

## SUITABILITY FOR USE:

These are products with Auto reset, hence never use the products for an application involving significant risk to life without ensuring that the system as a whole has been designed to address the risks and that our products are properly rated and installed for the intended use within the entire system or equipment.

## NOTE:

- The technical information provided in this document was correct at the time of going to Press.
- Product innovation being a continuous process, we reserve the right to alter specifications without any prior notice.

## TECHNICAL SPECIFICATION:

Cat. No.:	MAG03D0424
<b>Supply Specifications :</b>	
Supply Voltage (Un $\phi$ )	208 to 480 VAC +/-23%, 3P3W 120 to 277 VAC +/-23%, 3P4W
Frequency	47 to 63 Hz
Power Consumption	16VA at 415V supplied by L1 & L2
Selectable Supply Voltage through DIP S/W (Refer Functional Settings)	208V-220V-240V-380V-400V-415V- 440V -480V Ph-Ph <b>or</b> 120V-127V-139V-220V-230V-240V-256V -277V Ph-N
<b>Trip and Recovery Hysteresis Levels :</b>	
Under Voltage (UV)	-2 to -22% of Un +/-1%
UV Hysteresis	1% +/-0.5% for <=2% trip setting 2% +/-1% for >=4% trip setting
Over Voltage (OV)	2 to 22% of Un +/-1%
OV Hysteresis	1% +/-0.5% for <= 2% trip setting 2% +/-1% for >= 4% trip setting
Phase Asymmetry (ASY) (only between Ph-Ph)	Fix 10% +/-1%
Phase Asymmetry Hysteresis	2.7% +/-1%
3 Phase Interruption	22 msec +/-1 msec
Low Voltage Cut off	NA
High Voltage Cut off	NA
L3(B) Phase loss	Applicable. In case of L1 or L2 phase loss, product will turn OFF as product supply is taken from L1 & L2 phase.
Phase Reverse	Applicable
Release Time (OFF Delay)	Settable: 0 to 15 sec +/-1 sec <b>or</b> Fix: 5 sec +/-1 sec
	For phase fail, phase reverse & 3 Ph interruption fault, release time is less than 100 msec.
Operate Time (ON Delay)	Settable: 0 to 15 sec +/-1 sec <b>or</b> Fix: 5 sec +/-1 sec
Power ON delay	Power ON delay is equivalent to ON delay set or 1.4 sec (whichever is maximum).

Cat. No.:	MAG03D0425
<b>Supply Specifications :</b>	
Supply Voltage (Un $\pm$ )	415 VAC+/-45%, 3P3W 240 VAC+/-45%, 3P4W
Frequency	47 to 63 Hz
Power Consumption	16VA at 415V supplied by L1 & L2
Selectable Supply Voltage through DIP S/W (Refer Functional Settings)	NA
<b>Trip and Recovery Hysteresis Levels :</b>	
Under Voltage (UV)	Settable: -5 to -25% of Un+/-1% <b>or</b> Fix: Symmetric 60% of Un+/-1%
UV Hysteresis	Settable: 2 to 12% +/-1% <b>or</b> Fix: 2% of Un +/-0.5%
Over Voltage (OV)	Settable: 5 to 25% of Un +/-1% <b>or</b> Fix: Symmetric 110% of Un +/-1%
OV Hysteresis	Settable: 2 to 12% +/-1% <b>or</b> Fix: 2% +/-1%
Phase Asymmetry (ASY) (only between Ph-Ph)	Fix 10% +/-1%
Phase Asymmetry Hysteresis	2.7% +/-1%
3 Phase Interruption	22 msec +/-1 msec
Low Voltage Cut off	NA
High Voltage Cut off	NA
L3(B) Phase loss	Applicable. In case of L1 or L2 phase loss, product will turn OFF as product supply is taken from L1 & L2 phase.
Phase Reverse	Settable through DIP S/W
Release Time (OFF Delay)	Settable: 0 to 15 sec +/-1 sec <b>or</b> Fix: 5 sec +/-1 sec
	For phase fail, phase reverse & 3 Ph interruption fault, release time is less than 100 msec.
Operate Time (ON Delay)	Settable: 0 to 15 sec +/-1 sec <b>or</b> Fix: 5 sec +/-1 sec
Power ON delay	Power ON delay is equivalent to ON delay set or 1.4 sec (whichever is maximum).

Cat. No.:	MAG03D0426
<b>Supply Specifications :</b>	
Supply Voltage (Un $\pm$ )	415 VAC+/-45%, 3P3W 240 VAC+/-45%, 3P4W
Frequency	47 to 63 Hz
Power Consumption	16VA at 415V supplied by L1 & L2
Selectable Supply Voltage through DIP S/W (Refer Functional Settings)	NA
<b>Trip and Recovery Hysteresis Levels :</b>	
Under Voltage (UV)	Settable: -5 to -25% of Un+/-1% <b>or</b> Fix: Symmetric 80% of Un+/-1%
UV Hysteresis	2.7% +/-1%
Over Voltage (OV)	Fix : 110% of UN +/-1%
OV Hysteresis	2.7% +/-1%
Phase Asymmetry (ASY) (only between Ph-Ph)	Settable: 5 to 25% of Un +/-1% <b>or</b> Fix: 10% +/-1%
Phase Asymmetry Hysteresis	2.7% +/-1%
3 Phase Interruption	22 msec +/-1 msec
Low Voltage Cut off	NA
High Voltage Cut off	NA
L3(B) Phase loss	Applicable. In case of L1 or L2 phase loss, product will turn OFF as product supply is taken from L1 & L2 phase.
Phase Reverse	Settable through DIP S/W
Release Time (OFF Delay)	Settable: 0 to 15 second <b>or</b> minute +/-1 second or minute
	For phase fail, phase reverse & 3 Ph interruption fault, release time is less than 100 msec.
Operate Time (ON Delay)	Settable: 0.5 to 15 second <b>or</b> minute +/-1 second or minute
Power ON delay	Power ON delay is equivalent to ON delay set or 1.4 sec (whichever is maximum).

E-Waste Regulatory notice:  
Kindly treat, recycle or dispose of this equipment in an environmentally sound manner after End of Life, as per WEEE (Waste Electrical and Electronic Equipment) regulations; or hand it over to General Industrial Controls Pvt. Ltd, through website <https://www.gicindia.com/get-in-touch/>



Cat. No.:	MAG03D0425
<b>Supply Specifications :</b>	
Supply Voltage (Un $\neq$ )	415 VAC+/-45%, 3P3W
Frequency	47 to 63 Hz
Power Consumption	16VA at 415V supplied by L1 & L2
Selectable Supply Voltage through DIP S/W (Refer Functional Settings)	NA
<b>Trip and Recovery Hysteresis Levels :</b>	
Under Voltage (UV)	NA
UV Hysteresis	NA
Over Voltage (OV)	NA
OV Hysteresis	NA
Phase Asymmetry (ASY) (only between Ph-Ph)	Fix 30% +/-4%
Phase Asymmetry Hysteresis	7% +/-2%
3 Phase Interruption	22 msec +/-1 msec
Low Voltage Cut off	175V +/-10V Hys.22V +/-10V
High Voltage Cut off	570V +/-20V Hys.20V +/-10V
L3(B) Phase loss	Applicable. In case of L1 or L2 phase loss, product will turn OFF as product supply is taken from L1 & L2 phase.
Phase Reverse	NA
Release Time (OFF Delay)	<=500 msec For phase loss, it is <100 msec
Operate Time (ON Delay)	<=750 msec
Power ON delay	Power ON delay is equivalent to ON delay set or 1.4 sec (whichever is maximum).

Cat. No.:	MAG03D0428
<b>Supply Specifications :</b>	
Supply Voltage (Un $\neq$ )	208 to 480 VAC+/-23%, 3P3W
Frequency	47 to 63 Hz
Power Consumption	16VA at 415V supplied by L1 & L2
<b>Trip and Recovery Hysteresis Levels :</b>	
Phase Reverse	Applicable
L3(B) Phase Loss	Applicable. In case of L1 or L2 phase loss, product will turn OFF as product supply is taken from L1 & L2 phase.
3 Phase Interruption	22 msec +/-1 msec
Low Voltage Cut off	175V +/-10V Hys.22V +/-10V
High Voltage Cut off	570V +/-20V Hys.20V +/-10V
Release Time (OFF Delay)	For Phase Reverse & Phase Loss, it is <100 msec For High & Low cutoff, it is <500 msec
Operate Time (ON Delay)	<=750 msec
Power ON delay	Power ON delay is equivalent to ON delay set or 1.4 sec (whichever is maximum).

#### LED Indications:

R LED ON	Healthy supply
R LED OFF	Phase loss
R LED Blink	Phase reverse

#### Relay Output Specification :

Contact Material	Ag-alloy, Cd free
Contact Rating	1 C/O, 5A @ 250V AC /30V DC(resistive)
Utilization category	AC15-120V/3A, 240V/1.5A & DC13-24V/2A, 125V/0.22A & 250V/0.1A
Mechanical Life Expectancy	1x10 <sup>7</sup> operations
Electrical Life Expectancy	5x10 <sup>4</sup> operations

#### Environmental Specification :

Operating temperature	-20°C to 60°C
Storage temperature	-25°C to 70°C
Humidity	95% RH (Non-condensing)
Max operating altitude	2000m
Pollution Degree	2

#### EMI / EMC Standard Compliance :

Harmonic Current Emission	IEC 61000-3-2	Class A
ESD	IEC 61000-4-2	Level II
Radiated Susceptibility	IEC 61000-4-3	Level III
Electrical Fast transient	IEC 61000-4-4	Level IV
Surge	IEC 61000-4-5	Level IV
Conducted Susceptibility	IEC 61000-4-6	Level III
Voltage Dips & Interruption	IEC 61000-4-11	
Radiated & Conducted Emission	CISPR-11	Class A

#### Environmental Standard Compliance :

Cold Heat	IEC 60068-2-1
Dry Heat	IEC 60068-2-2
Vibration	IEC 60068-2-6 10Hz to 55Hz

LED Indication :				
Applicable for MAG03D0424/ MAG03D0425/ MAG03D0426				
Condition	PWR LED (Green)	UV (Red)	OV (Red)	ASY (Red)
Supply Healthy	ON	OFF	OFF	OFF
Under Voltage	ON	ON	OFF	OFF
Over Voltage	ON	OFF	ON	OFF
Phase Asymmetry	ON	OFF	OFF	BLINK@1sec
L3 Phase Loss*	BLINK@1sec	OFF	OFF	OFF
Phase Reverse	ON	OFF	OFF	ON
3Ph Interruption	OFF	OFF	OFF	OFF
DIP S/W Change	All LED blinks@200 msec rate if DIP S/W set in run time.			
*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 MAG03D0427, 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.				

Relay Output Specification :	
Contact Material	Ag-alloy, Cd free
Contact Rating	1 C/O, 5A @ 250V AC /30V DC(resistive)
Utilization category	AC15-120V/3A, 240V/1.5A & DC13-24V/2A, 125V/0.22A & 250V/0.1A
Mechanical Life Expectancy	1x10 <sup>7</sup> operations
Electrical Life Expectancy	5x10 <sup>4</sup> operations

Environmental Specification :	
Operating temperature	-20°C to 60°C
Storage temperature	-25°C to 70°C
Humidity	95% RH (Non-condensing)
Max operating altitude	2000m
Pollution Degree	2

EMI / EMC Standard Compliance :	
Harmonic Current Emission	IEC 61000-3-2 Class A
ESD	IEC 61000-4-2 Level II
Radiated Susceptibility	IEC 61000-4-3 Level III
Electrical Fast transient	IEC 61000-4-4 Level IV
Surge	IEC 61000-4-5 Level IV
Conducted Susceptibility	IEC 61000-4-6 Level III
Voltage Dips & Interruption	IEC 61000-4-11
Radiated & Conducted Emission	CISPR-11 Class A

Environmental Standard Compliance :		
Cold Heat	IEC 60068-2-1	
Dry Heat	IEC 60068-2-2	
Vibration	IEC 60068-2-6 10Hz to 55Hz	
Safety Standard Compliance :		
Test voltage between I/P & O/P	IEC 60947-5-1	2KV
Impulse voltage between I/P & O/P	IEC 60947-5-1	Level IV
Single Fault	IEC 61010-01	Level IV
Insulation Resistance	UL508	>50KΩ
Leakage Current	UL508	<3.5mA

**CONNECTION DIAGRAM :**

**TERMINAL DETAILS :**

ø3.5mm	Torque-0.4Nm(3.6lb.in) Terminal Screw-M3
	1 x 2.5mm <sup>2</sup> Solid/Stranded Wire
AWG	1 x 24 to 12

**PRODUCT DIMENSIONS AND MOUNTING :**

Mechanical Specification :	
Housing	Flame Retardant UL 94-V0
Dimensions in mm (W x L x D)	18 x 90 x 66.5
Degree of protection	Ip20 for Terminals IP30 for Enclosure
Weight (unpacked)	75 gms approx.

**FUNCTIONAL SETTINGS :**

**Cat ID : MAG03D0424**

UV trip % adjustment pot

OV trip % adjustment pot

Delay adjustment pot. It can be configured as ON or OFF delay as set by DIP S/W no.4

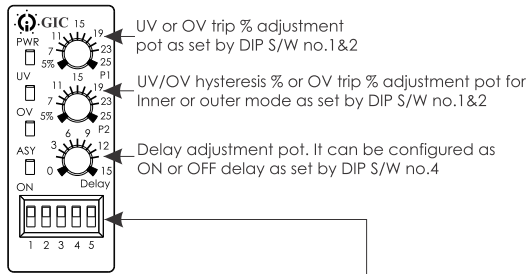
ON (1) OFF (0)

**5 Pole DIP Switch Settings :**

480	277	Ph - Ph
440	256	Ph - N
415	240	Supply Type
400	230	3P3W or 3P4W Supply Setting
380	220	1 Settable OFF Delay
240	139	0 Fix ON Delay
220	127	1 Settable ON Delay
208	120	0 Fix OFF Delay
Ph - Ph (VAC)	Ph - N (VAC)	4 Delay

Supply Voltage Setting      ON or OFF Delay Setting

- NOTE :** (Applicable for all cat Ids)
- DIP S/W settings can not be changed in power ON condition.
  - If DIP S/W is changed during power ON, then all LEDs on product start blinking.
  - New DIP S/W settings can be applied only if product supply is turned OFF and ON.
  - Pot settings can be changed in power ON condition also.



5 Pole DIP Switch Settings :

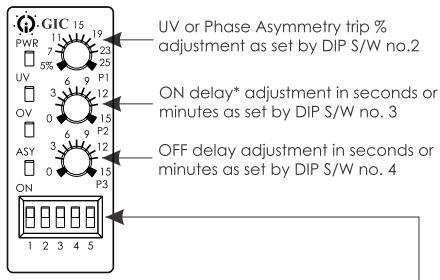
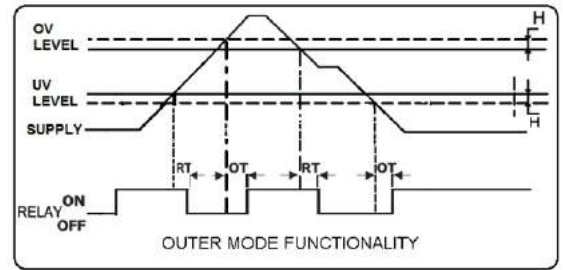
1	Settable UV with fix OV	1	Settable OFF Delay Fix ON Delay
1	Settable OV with fix UV	1	Settable ON Delay Fix OFF Delay
1	Inner Mode	4	Delay
1	Outer Mode		
1 2	Function		
1	Phase Seq. Disable	1	Ph - Ph
1	Phase Seq. Enable	1	Ph - N
3	Function	5	Supply Type

**NOTE :**

- \*1. If 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%. Here pot P2 scale 5% to 25% is divided by 2 and remainder is not considered to set hysteresis range from 2% to 12%.
- 2. If hysteresis % is more than trip % then it is considered as 2%.

**Inner Mode Functionality :** In this operating mode, if supply voltage falls below under voltage threshold (set by Pot-P1) or exceeds the over voltage threshold (set by Pot-P2) then relay trips. If supply voltage is within the threshold settings of UV and OV, then relay turns ON.

**Outer Mode Functionality :** In this operating mode, if any of the phase/line voltage is within the threshold level set by Under voltage Pot-P1 and Over voltage Pot-P2, then relay trips. If all phase/line voltages are outside the threshold levels set by UV and OV pot, then relay turns ON. (Refer Operation diagram)

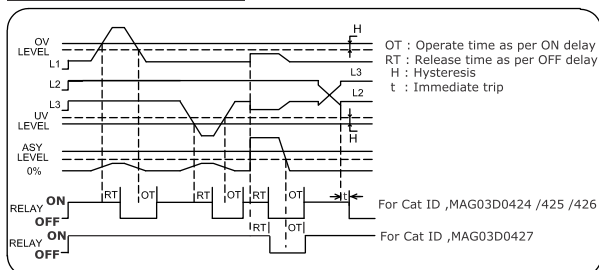


5 Pole DIP Switch Settings :


1	Phase Seq. Disable	1	Settable (POT-P2) ON Delay in sec	1	Ph - Ph
1	Phase Seq. Enable	1	Settable (POT-P2) ON Delay in min	1	Ph - N
1	Function	3	Delay	5	Supply Type
1	Settable UV(POT-P1) with fix asymmetry	1	Settable (POT-P3) OFF Delay in sec		
1	Settable ASY (POT-P1) with fix UV	1	Settable (POT-P3) OFF Delay in min		
2	Function	4	Delay		

**NOTE :** \*For ON delay pot, consider 0 marking as 0.5

**OPERATION DIAGRAM :**



E-Waste Regulatory notice:  
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# SUPPLY MONITORING DEVICE SERIES SM-175

## Ordering Catalog Nos.:

MK21D5  
MC21D5  
MA21DN  
MD21DF  
MG21DH  
MG21DF  
MN21D5  
MGD1DR  
MOF1D51



## PRODUCT DESCRIPTION:

Digital supply monitoring relay (Series SM 800) monitors Over voltage, under voltage, over frequency, under frequency, phase loss, Phase asymmetry, Phase sequence & neutral fail in 3 phase system.

## FEATURES:

- Controls own supply voltage.
- Multi-voltage from 3x208 to 3x480 V
- LED status indication.
- SPDT Relay output (5A resistive)
- 30 to 40ms instant tripping for 2 & 3-phase interruption.
- Din Rail & Base mounting.

## CAUTION:

- Do not touch the terminals while power is being supplied.
- Tighten terminal screws with the specified torque.
- Always follow instructions stated in product leaflet.
- Before installation, check to ensure that specifications agree with intended application.
- Installation to be done by skilled electrician
- Suitable dampers should be provided in the event of excessive vibrations.

## SUITABILITY FOR USE:

These are products with Auto reset and Auto Switch On, hence never use the products for an application involving significant risk to life without ensuring that the system as a whole has been designed to address the risks and that our products are properly rated and installed for the intended use within the entire system or equipment.

## NOTE:

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## FUNCTION DESCRIPTION:

### MK21D5

Controls:-

1. Correct sequence of three phases.
2. Failure of any of three phases when voltage falls below rated minimum of threshold.

### MC21D5

Controls:-

1. Correct sequence of the three phases.
2. Failure of any of the three phases.
3. Failure due to Asymmetry fixed at 30%.

### MA21DN

Controls:-

1. Correct sequence of the three phases.
2. Failure of any of the three phases .
3. Failure due to Asymmetry adjustable from 5% to 15%.

### MD21DF

Controls:-

1. Correct sequence of the three phases.
2. Failure of any of the three phases.
3. Under & Over Voltage adjustable from 2 to 20% of Un  
(Up to - 12% across 3x208 V Range;  
Up to - 16% across 3x220 V Range; Up to +10% across 3x480 V Range)

### MGD1DR

Controls:-

1. Correct sequence of the three phases.
2. Failure of any of the three phases.
3. Under & Over Voltage adjustable from 5 to 25%.
4. Failure due to Asymmetry fixed at 10%.

### MG21DH/MG21DF

Controls:-

1. Correct sequence of the three phases.
2. Failure of any of the three phases.
3. Under & Over Voltage adjustable from 5 to 25% of Un  
(Up to - 12% across 3x208 V Range;  
Up to - 16% across 3x220 V Range;  
Up to +20% across 3x440 V Range;  
Up to +10% across 3x480 V Range)
4. Failure due to Asymmetry fixed at 10%.

### MN21D5

Controls:-

1. Failure of any of the three phases.
2. Failure due to Asymmetry fixed at 30%.

### MOF1D51

Controls:-

1. Failure of any of the three phases.
2. Failure due to Asymmetry fixed at 10%.

Incase of any query, please write us at [service@gicindia.com](mailto:service@gicindia.com)  
Or visit [www.gicindia.com](http://www.gicindia.com)

**TECHNICAL SPECIFICATION:**

**SUPPLY MONITORING DEVICE SERIES : SM-175**

Cat. No.:		MK21D5	MC21D5	
Function		Phase Control		
Supply Voltage (≒)		208 to 480 VAC, 3P3W (-12% to +10% of ≒)		
Frequency		47 to 63 Hz		
Power Consumption		3 VA (Max.)		
Adjustable Nominal Voltage (≒)		N.A.		
Trip Levels	Under Voltage	N.A.		
	Over Voltage	N.A.		
	Asymmetry	N.A.	30% fixed	
Setting Accuracy		+/- 5% of full scale		
Setting Accuracy (±10% of full scale)	Operate Time	<750 ms		
		MK21D5,MC21D5,MN21D5 & MOF1D51 products 'Operate Time' at Power ON is <1.5 sec. For MGD1DR & MG21DH OT is 1.5 sec if pot is at 0 range.		
	Power ON Delay	<1.5 sec		
	Release Time	UV, OV and Asymmetry	~ 550 ms	
		Phase Reverse	<65 ms.	
	Phase Loss	For Phase Loss Fault in the absence of Motor load Release Time is <65 ms.		
LED Indications	R/≒	Healthy	R Continuous ON	
		Ph Reverse	R Flashing	
		Asymmetry	N.A.	R OFF
	OV	N.A.		
	UV	N.A.		
	AS	N.A.		
	ALL LEDs	OFF	Phase Fail or Higher Cut OFF (> 560 VAC) or lower cut off (<175 VAC) (for MOF1D51, MK21D5, MC21D5 & MN21D5 Lower Cut Off is < 138 VAC)	
	Flashing	N.A.		
Relay Output	Contact Rating		1 C/O , 5A (Res.) @ 250 VAC / 30 VDC	
	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	
	Contact Material		Ag Alloy	
Mechanical Life Expectancy		3 x 10 <sup>6</sup> Operations		
Electrical Life Expectancy		1 x 10 <sup>5</sup> Operations		
Operating Temperature		-15 °C to +60 °C		
Storage Temperature		-20 °C to +80 °C		
Humidity (Non-Condensing)		5 to 95 % (Non-Condensing)		
Max. Operating Altitude		2000 m		
Degree of Protection		IP-20 for Terminals; IP-30 for Housing		
Pollution Degree		II		
Housing		Flame Retardant UL 94-V0		
Mounting		Base / Din-Rail (35 mm Symmetrical)		
Dimensions in mm (W x H x L)		18 x 59 x 90		
Weight (Unpacked)		70 gm Approx.		
Certifications		CE, RoHS		

Cat. No.:		MN21D5	MA21DN	
Function		Phase Control		
Supply Voltage (≒)		208 to 480 VAC, 3P3W (-12% to +10% of ≒)		
Frequency		47 to 63 Hz		
Power Consumption		3 VA (Max.)		
Adjustable Nominal Voltage (≒)		N.A.		
Trip Levels	Under Voltage	N.A.		
	Over Voltage	N.A.		
	Asymmetry	30% fixed	5 to 15%	
Setting Accuracy		+/- 5% of full scale		
Setting Accuracy (±10% of full scale)	Operate Time	<750 ms	5 s fixed	
		MK21D5,MC21D5,MN21D5 & MOF1D51 products 'Operate Time' at Power ON is <1.5 sec. For MGD1DR & MG21DH OT is 1.5 sec if pot is at 0 range.		
	Power ON Delay	<1.5 sec		
	Release Time	UV, OV and Asymmetry	~ 550 ms	<0.55 to 15s
		Phase Reverse	<65 ms.	
	Phase Loss	For Phase Loss Fault in the absence of Motor load Release Time is <65 ms.		
LED Indications	R/≒	Healthy	R Continuous ON	
		Ph Reverse	N.A.	R Flashing
		Asymmetry	R OFF	R OFF
	OV	N.A.		
	UV	N.A.		
	AS	N.A.		
	ALL LEDs	OFF	Phase Fail or Higher Cut OFF (> 560 VAC) or lower cut off (<175 VAC) (for MOF1D51, MK21D5, MC21D5 & MN21D5 Lower Cut Off is < 138 VAC)	
	Flashing	N.A.		
Relay Output	Contact Rating		1 C/O , 5A (Res.) @ 250 VAC / 30 VDC	
	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	
	Contact Material		Ag Alloy	
Mechanical Life Expectancy		3 x 10 <sup>6</sup> Operations		
Electrical Life Expectancy		1 x 10 <sup>5</sup> Operations		
Operating Temperature		-15 °C to +60 °C		
Storage Temperature		-20 °C to +80 °C		
Humidity (Non-Condensing)		5 to 95 % (Non-Condensing)		
Max. Operating Altitude		2000 m		
Degree of Protection		IP-20 for Terminals; IP-30 for Housing		
Pollution Degree		II		
Housing		Flame Retardant UL 94-V0		
Mounting		Base / Din-Rail (35 mm Symmetrical)		
Dimensions in mm (W x H x L)		18 x 59 x 90		
Weight (Unpacked)		70 gm Approx.		
Certifications		CE, RoHS		

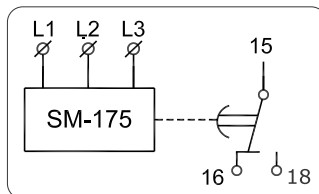
Cat. No.:		MOF1D51	MD21DF	
Function		Phase Control	Phase and Voltage Control	
Supply Voltage (≡)		208 to 480 VAC, 3P3W (-12% to +10% of ≡)		
Frequency		47 to 53 Hz	47 to 63 Hz	
Power Consumption		3 VA (Max.)		
Adjustable Nominal Voltage (≡)		N.A.	208 - 220 - 380 - 400 - 415 - 440 - 480 VAC	
Trip Levels	Under Voltage	N.A.	-2 to -20% of ≡	
	Over Voltage	N.A.	2 to 20% of ≡	
	Asymmetry	10% fixed	N.A.	
Setting Accuracy		+/- 5% of full scale		
Setting Accuracy (±10% of full scale)	Operate Time	<750 ms	5 s fixed	
		MK21D5, MC21D5, MN21D5 & MOF1D51 products 'Operate Time' at Power ON is <1.5 sec. For MGD1DR & MG21DH OT is 1.5 sec if pot is at 0 range.		
	Power ON Delay	<1.5 sec		
	Release Time	UV, OV and Asymmetry	~ 550 ms	<0.55 to 15s
		Phase Reverse	<65 ms.	
Phase Loss		For Phase Loss Fault in the absence of Motor load Release Time is <65 ms.		
LED Indications	R/≡	Healthy	R Continuous ON ≡ Continuous ON	
		Ph Reverse	N.A.	≡ Flashing
		Asymmetry	R Flashing	N.A.
	OV	N.A.		Over Voltage
	UV	N.A.		Under Voltage
	AS	N.A.		
	ALL LEDES	OFF	Phase Fail or Higher Cut OFF (> 560 VAC) or lower cut off (<175 VAC) (for MOF1D51, MK21D5, MC21D5 & MN21D5 Lower Cut Off is < 138 VAC)	
	Flashing	N.A.	≡ Ref. Pot changed during running conditions	
Relay Output	Contact Rating		1 C/O , 5A (Res.) @ 250 VAC / 30 VDC	
	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	
Contact Material		Ag Alloy		
Mechanical Life Expectancy		3 x 10 <sup>6</sup> Operations		
Electrical Life Expectancy		1 x 10 <sup>5</sup> Operations		
Operating Temperature		-15 °C to +60 °C		
Storage Temperature		-20 °C to +80 °C		
Humidity (Non-Condensing)		5 to 95 % (Non-Condensing)		
Max. Operating Altitude		2000 m		
Degree of Protection		IP-20 for Terminals; IP-30 for Housing		
Pollution Degree		II		
Housing		Flame Retardant UL 94-V0		
Mounting		Base / Din-Rail (35 mm Symmetrical)		
Dimensions in mm (W x H x L)		18 x 59 x 90		
Weight (Unpacked)		70 gm Approx.		
Certifications		CE, RoHS		

Cat. No.:		MG21DH	MG21DF	
Function		Phase and Voltage Control		
Supply Voltage (≡)		208 to 480 VAC, 3P3W (-12% to +10% of ≡)		
Frequency		47 to 63 Hz		
Power Consumption		3 VA (Max.)		
Adjustable Nominal Voltage (≡)		208 - 220 - 380 - 400 - 415 - 440 - 480 VAC		
Trip Levels	Under Voltage	-5 to -25% of ≡		
	Over Voltage	5 to 25% of ≡		
	Asymmetry	10% fixed		
Setting Accuracy		+/- 5% of full scale		
Setting Accuracy (±10% of full scale)	Operate Time	550 ms to 100s		
		MK21D5, MC21D5, MN21D5 & MOF1D51 products 'Operate Time' at Power ON is <1.5 sec. For MGD1DR & MG21DH OT is 1.5 sec if pot is at 0 range.		
	Power ON Delay	<1.5 sec		
	Release Time	UV, OV and Asymmetry	5 s fixed	<0.55 to 100s
		Phase Reverse	<65 ms.	
Phase Loss		For Phase Loss Fault in the absence of Motor load Release Time is <65 ms.		
LED Indications	R/≡	Healthy	≡ Continuous ON	
		Ph Reverse	≡ Flashing	
		Asymmetry	N.A.	
	OV	N.A.		Over Voltage
	UV	N.A.		Under Voltage
	AS	N.A.		Asymmetry
	ALL LEDES	OFF	Phase Fail or Higher Cut OFF (> 560 VAC) or lower cut off (<175 VAC) (for MOF1D51, MK21D5, MC21D5 & MN21D5 Lower Cut Off is < 138 VAC)	
	Flashing	≡ Ref. Pot changed during running conditions		
Relay Output	Contact Rating		1 C/O , 5A (Res.) @ 250 VAC / 30 VDC	
	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	
Contact Material		Ag Alloy		
Mechanical Life Expectancy		3 x 10 <sup>6</sup> Operations		
Electrical Life Expectancy		1 x 10 <sup>5</sup> Operations		
Operating Temperature		-15 °C to +60 °C		
Storage Temperature		-20 °C to +80 °C		
Humidity (Non-Condensing)		5 to 95 % (Non-Condensing)		
Max. Operating Altitude		2000 m		
Degree of Protection		IP-20 for Terminals; IP-30 for Housing		
Pollution Degree		II		
Housing		Flame Retardant UL 94-V0		
Mounting		Base / Din-Rail (35 mm Symmetrical)		
Dimensions in mm (W x H x L)		18 x 59 x 90		
Weight (Unpacked)		70 gm Approx.		
Certifications		CE, RoHS		

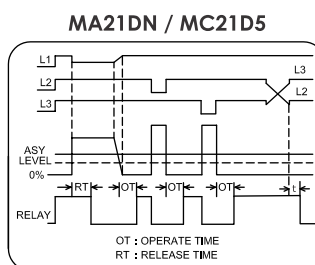
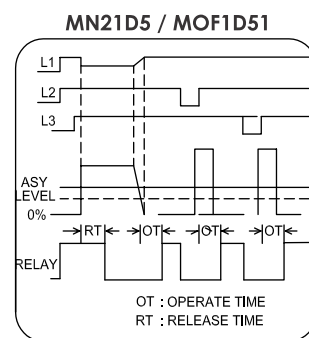
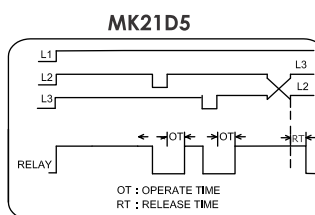
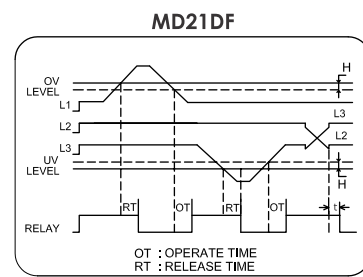
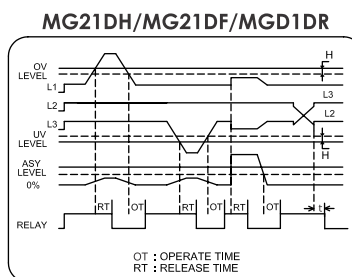


Cat. No.:		MGD1DR		
Function		Phase and Voltage Control		
Supply Voltage (≡)		400 VAC, 3P3W		
Frequency		47 to 63 Hz		
Power Consumption		3 VA (Max.)		
Adjustable Nominal Voltage (≡)		N.A.		
Trip Levels	Under Voltage	-5 to -25% of ≡		
	Over Voltage	5 to 25% of ≡		
	Asymmetry	10% fixed		
Setting Accuracy		+/- 5% of full scale		
Setting Accuracy (±10% of full scale)	Operate Time	<550ms to 100s		
		MK21D5, MC21D5, MN21D5 & MOF1D51 products 'Operate Time' at Power ON is <1.5 sec. For MGD1DR & MG21DH OT is 1.5 sec if pot is at 0 range.		
	Power ON Delay	<1.5 sec		
	Release Time	UV, OV and Asymmetry	~ 550ms to 15s	
		Phase Reverse	<65 ms.	
Phase Loss		For Phase Loss Fault in the absence of Motor load Release Time is <65 ms.		
LED Indications	R/≡	Healthy	≡ Continuous ON	
		Ph Reverse	≡ Flashing	
		Asymmetry	≡ Continuous ON	
	OV	Over Voltage		
	UV	Under Voltage		
	AS	Asymmetry		
	ALL LEDES	OFF	Phase Fail or Higher Cut Off (> 560 VAC) or lower cut off (<175 VAC) (for MOF1D51, MK21D5, MC21D5 & MN21D5 Lower Cut Off is < 138 VAC)	
Flashing		N.A.		
Relay Output	Contact Rating		1 C/O , 5A (Res.) @ 250 VAC / 30 VDC	
	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	
Contact Material		Ag Alloy		
Mechanical Life Expectancy		3 x 10 <sup>6</sup> Operations		
Electrical Life Expectancy		1 x 10 <sup>5</sup> Operations		
Operating Temperature		-15 °C to +60 °C		
Storage Temperature		-20 °C to +80 °C		
Humidity (Non-Condensing)		5 to 95 % (Non-Condensing)		
Max. Operating Altitude		2000 m		
Degree of Protection		IP-20 for Terminals; IP-30 for Housing		
Pollution Degree		II		
Housing		Flame Retardant UL 94-V0		
Mounting		Base / Din-Rail (35 mm Symmetrical)		
Dimensions in mm (W x H x L)		18 x 59 x 90		
Weight (Unpacked)		70 gm Approx.		
Certifications		CE, RoHS		

### CONNECTION DIAGRAM





### FUNCTION DIAGRAM



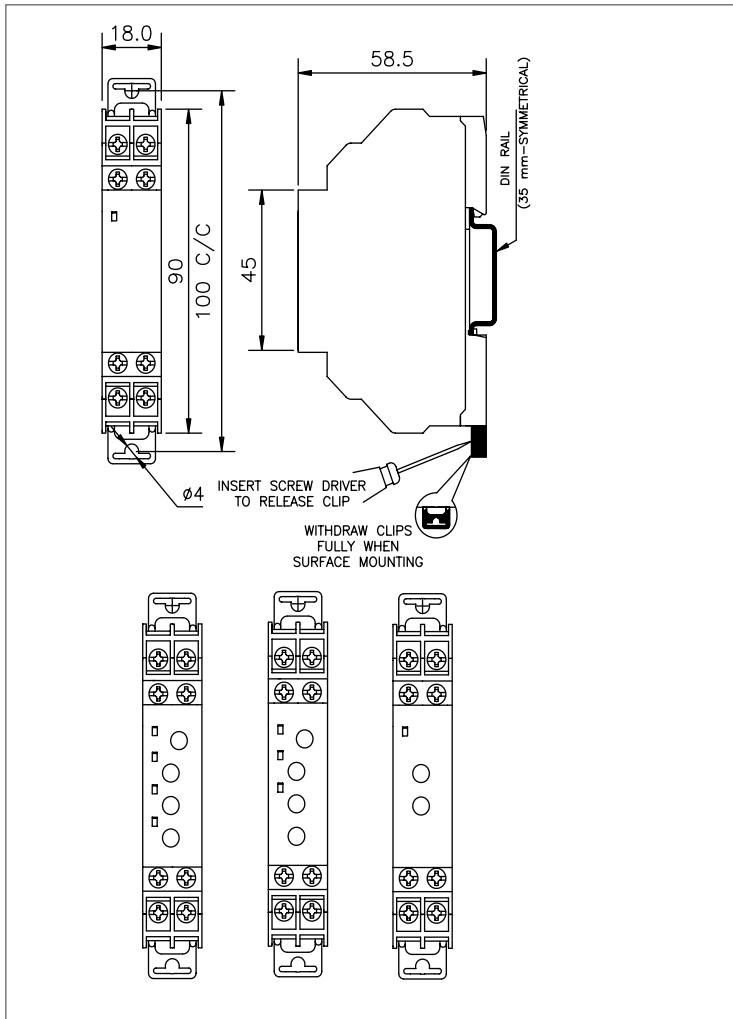
#### Note:

- In case of MC21D5, MG21DH/MG21DF, phase imbalance levels are fixed. So, for very large motors with excessive back e.m.f. relay suitability to be checked by the user.
- Minimum threshold supply voltage of tripping is 140 VAC for MK21D5, MC21D5.

### Terminal Details :

 Ø4.....5.0mm Combi Head Bit./Flat	0.5 Nm (4.4lb.in) to 0.7 Nm (6.2lb.in)
	2 x 2.5 mm <sup>2</sup> Solid / Standard Wire
AWG	20 to 12

## OVERALL MOUNTING DIMENSIONS (in mm)



## CERTIFICATION :

### EMI/EMC :

Harmonic Current Emission	IEC 61000-3-2	Class A
ESD	IEC 61000-4-2	Level II
Radiated Susceptibility	IEC 61000-4-3	Level III
Electrical Fast Transients	IEC 61000-4-4	Level IV
Surge	IEC 61000-4-5	Level III
Conducted Susceptibility	IEC 61000-4-6	Level III
Voltage Dips, & Interruptions (AC)	IEC 61000-4-11	
Radiated Emission	CISPR 14 -11	Class A
Conducted Emission	CISPR 14 -11	Class A

### Safety :

Test Voltage between I/P and O/P	IEC 60947-5-1	2kV
Impulse Voltage between I/P and O/P	IEC 60947-5-1	2.5kV
Single Fault	IEC 61010- 01	Level IV
Insulation Resistance	UL 508	>50 k $\Omega$
Leakage Current	UL 508	<3.5 mA

### Environmental :

Cold Heat	IEC 60068-2-1	
Dry Heat	IEC 60068-2-2	
Vibration	IEC 60068-2-6	10 Hz - 55Hz
Repetitive Shock	IEC 60068-2-27	40 g, 6 ms
Non-Repetitive Shock	IEC 60068-2-27	30 g, 15 ms

E-Waste Regulatory notice:  
Kindly treat, recycle or dispose of this equipment in an environmentally sound manner after End of Life, as per WEEE (Waste Electrical and Electronic Equipment) regulations; or hand it over to General Industrial Controls Pvt. Ltd, through website <https://www.gicindia.com/get-in-touch/>

