### **TECHNICAL SPECIFICATIONS:**

DMS110

Ordering Cat. Nos.:

**Supply Characteristics:** 

Power Voltage Type
CL1,L2 & L3)
Power Supply Frequency   45 - 65 Hz   26VA   26V
Nomitoring Signal   R, Y, B & N (3P3W and 3P4W Menu configurable)   Phase voltage : 50 to 288 VAC
Monitoring Signal         R, Y, B & N (3P3W and 3P4W Menu configurable)           Phase voltage : 90 to 288 VAC Line voltage : 155 to 500 VAC           Measuring Frequency Range         45 - 65 Hz           Relay Output Characteristics:           Contact Arrangement         1 C/O Relay 1: 1 C/O Relay 1: 15(Pole),16(NC),18(NO) & Relay 2: 25(Pole),26(NC),28(NO)           Contact Rating         5A (Resistive) @ 240 VAC / 30 VDC           Mechanical Life Expectancy         1 x 10² Operations           Electrical Life Expectancy         1 x 10² Operations           Contact Material         AC-15         (V) 120/240 V           Utilization category         (V) 24/125/250 V           Dc-13         (V) 24/125/250 V           Dc-13         (V) 24/125/250 V           Display Indication:           Display Type         LCD           Backlight         Green LED Backlight           Viewing Angle         6 O'Clock
Measuring Voltage Range         Phase voltage : 90 to 288 VAC Line voltage : 50 to 288 VAC Line voltage : 50 to 288 VAC Line voltage : 50 to 288 VAC Line voltage : 85 to 500 VAC           Measuring Frequency Range         45 - 65 Hz           Relay Output Characteristics:           1 C/O Relay 1:
Line voltage : 155 to 500 VAC   Line voltage : 85 to 500 VAC
Contact Arrangement
Contact Arrangement
1 C/O
Contact Arrangement
15(Pole),16(NC),18(NO)   Relay 2: 25(Pole),26(NC),28(NO)
Contact Rating         5A (Resistive) @ 240 VAC / 30 VDC           Mechanical Life Expectancy         1 x 10² Operations           Electrical Life Expectancy         1 x 10² Operations           Contact Material         AgSnO2           Utilization category         (V) 120/240 V           DC-13         (V) 24/125/250 V           (A) 2/0.22/0.1 A           Display Indication:           Display Type         LCD           Backlight         Green LED Backlight           Viewing Angle         6 O'Clock
Telectrical Life Expectancy
Contact Material
Utilization category       (V) 120/240 V         (AC-15)       (V) 24/125/250 V         DC-13       (A) 20.22/0.1 A         Display Indication:       LCD         Backlight       Green LED Backlight         Viewing Angle       6 O'Clock
DC-13   (V)   24/125/250 V     DC-13   (V)   24/125/250 V     (A)   2/0.22/0.1 A     Display Indication:   Display Type
Display Indication:  Display Type LCD  Backlight Green LED Backlight  Viewing Angle 6 O'Clock
Display Type LCD Backlight Green LED Backlight Viewing Angle 6 O'Clock
Backlight Green LED Backlight Viewing Angle 6 O'Clock
Viewing Angle 6 O'Clock
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keys:
Escape (1) Escape key.
Up (▲) To scroll setting parameters upword.  Down (▼) To scroll setting parameters downword.
Enter (+) Enter key.
Feature Characteristics:
Selection of Measuring Phase to Phase voltage (3P-3W)
circuit Phase to Neutral voltage (3P-4W) (Default)
Reference Voltage  Configurable (Frable (Biable) Default - Biable
Selection of reference Voltage Configurable (Enable/Disable) Default : Disable  Phase voltage : 110 to 270 VAC (Default 240V)
Reference voltage selection band Line voltage: 110 to 270 VAC (Default 240V)  Line voltage: 190 to 470 VAC (Default 415V)
Measuring Range
Phase voltage: 90 to 288 VAC (Default 192V) 50 to 288 VAC (Default 192V)
Under Voltage Line voltage: 155 to 500 VAC (Default 332V) 85 to 500 VAC (Default 332V)
Note: Maximum threshold of under voltage = OV threshold - hysteresis - 5V
Lower Limit: 55% of Ref. voltage or 'X' whichever is max. Here X is 60V-3P4W,100V-3P3W
Under Voltage  Upper Limit: < Reference voltage - 3V - Hysteresis  (When Reference Enabled)  Default: When ref is made on die LIV OV and hysteresis will set to factory default values.
(When Reference Enabled)  Default: When ref is made en/dis UV, OV and hysteresis will set to factory default values.  When ref. vtg is changed, if UV thresholds are out of band then UV will set to 80% of ref. vtg
Phase voltage: 90 to 288 VAC (Default 264V) 50 to 288 VAC (Default 264V)
Over Voltage Line voltage: 155 to 500 VAC (Default 456V) 85 to 500 VAC (Default 456V)
Note: Minimum threshold of over voltage = UV threshold + hysteresis + 5V
Lower Limit: Reference voltage + 3V + Hysteresis
Over Voltage Upper Limit: 125% of reference or 'X' whichever is min. Here X is 288V-3P4W,500V-3P3W
(When Reference Enabled)  Default: When ref. is made en/dis UV, OV and hysteresis will set to factory default values.
When ref. vtg is changed, if OV thresholds are out of band then OV will set to 110% of ref. vt
Low Cut Off         Phase voltage : 85 VAC         45 VAC           Line voltage : 150 VAC         80 VAC
Low Cut Off (When Ref. Enable) 40 % of reference voltage
Phase voltage: 310 VAC 325 VAC
High Cut Off Line voltage: 535 VAC 555 VAC
High Cut Off (When Ref. Enable) 140% of ref. voltage or "X" = 3P4W:310/325V and 3P3W:535/555V high cutoff as per cat id.
Under Frequency 45 to 65 Hz (Default 48Hz)
Over Frequency 45 to 65 Hz (Default 52Hz)
Note: Due to locking between threshold & hysteresis, minimum 2Hz difference will be there
between UF threshold and OF threshold. Difference band between UF threshold & OF threshold.
will increase if hysteresis is increased.
Asymmetry* Voltage: 8 to 99 VAC (Default 60V) Percentage: 4 to 50% (Default 10%)
Hysteresis   Fercentage 1.4 to 30 % (Beldalic 10 %)
UV, OV, LC & HC Hysteresis 3 to (20VAC or (OV-UV-5V) Whichever is minimum) (Default 7V)
Lower Limit: 3 V
Under Voltage Hysteresis  Upper Limit: (Ref. vtg - UV - 3V OR OV - Ref. vtg - 3V OR 20V whichever is minimum)
(When Reference Enabled)  Default: 7V
Lower Limit: 3 V
Over Voltage Hysteresis  Upper Limit: (Ref. vtg - UV - 3V OR OV - Ref.vtg -3V OR 20V whichever is minimum)
(When Reference Enabled)  Default : 7V
Frequency Hysteresis 0.5 to 2 Hz (Default 1Hz)
Hysteresis for Asymmetry Voltage: 3 to 99 VAC (Default 7V)
Percentage : 2 to 15% (Default 2%)
Other Monitoring Functions
Phase Loss Configurable(Enable/Disable) (Default : Enable)
Phase Reverse Configurable(Enable/Disable) (Default : Enable)
Phase Reverse Configurable(Enable/Disable) (Default : Enable)  Neutral Loss Configurable(Enable/Disable) (Default : Enable) (Applicable only in 3P4W configuration)
Neutral Loss Configurable(Enable/Disable) (Default : Enable) (Applicable only in 3P4W configuration)  Voltage : 1V Frequency Threshold : 1Hz
Neutral Loss Configurable(Enable/Disable) (Default : Enable) (Applicable only in 3P4W configuration)  Voltage : 1V  Frequency Threshold : 1Hz Frequency Hysteresis: 0.1Hz
Neutral Loss Configurable(Enable/Disable) (Default : Enable) (Applicable only in 3P4W configuration)  Voltage : 1V Frequency Threshold : 1Hz
Neutral Loss  Configurable(Enable/Disable) (Default : Enable) (Applicable only in 3P4W configuration)  Voltage : 1V  Frequency Threshold : 1Hz Frequency Hysteresis: 0.1Hz Time : 0.1 sec (For 0.1 to 99.9sec timing range)
Neutral Loss  Configurable(Enable/Disable) (Default : Enable) (Applicable only in 3P4W configuration)  Voltage : 1V Frequency Threshold : 1Hz Frequency Hysteresis: 0.1Hz Time : 0.1 sec (For 0.1 to 99.9sec timing range) 1 sec (For 100 to 999sec timing range)(Power ON delay resolution is 1 sec.)  Voltage : +/- 5V Frequency : +/- 0.3Hz
Neutral Loss  Configurable(Enable/Disable) (Default : Enable) (Applicable only in 3P4W configuration)  Voltage : 1V Frequency Threshold : 1Hz Frequency Hysteresis: 0.1Hz Time : 0.1 sec (For 0.1 to 99.9sec timing range) 1 sec (For 100 to 999sec timing range)(Power ON delay resolution is 1 sec.)  Voltage : +/- 5V Frequency : +/- 0.3Hz Time : +/- (2% of setting +100msec) for UV,OV & Asymmetry
Neutral Loss  Configurable(Enable/Disable) (Default : Enable) (Applicable only in 3P4W configuration)  Voltage : 1V Frequency Threshold : 1Hz Frequency Hysteresis: 0.1Hz Time : 0.1 sec (For 0.1 to 99.9sec timing range) 1 sec (For 100 to 999sec timing range)(Power ON delay resolution is 1 sec.)  Voltage : +/- 5V Frequency : +/- 0.3Hz Time : +/- (2% of setting +100msec) for UV,OV & Asymmetry +/- (2% of setting +500msec) for UF & OF
Neutral Loss  Configurable(Enable/Disable) (Default : Enable) (Applicable only in 3P4W configuration)  Voltage : 1V Frequency Threshold : 1Hz Frequency Hysteresis: 0.1Hz Time : 0.1 sec (For 0.1 to 99.9sec timing range) 1 sec (For 100 to 999sec timing range)(Power ON delay resolution is 1 sec.)  Voltage : +/- 5V Frequency : +/- 0.3Hz Time : +/- (2% of setting +100msec) for UV,OV & Asymmetry

**DMS120** 

DMA220

Reset	Enter key long press for 1sec (applicable for "Manual Mode (Latch")		
Password Protection	Configurable(Enable/Disable) 3 Digit Password (Default : Disable)		
Fault Memory	Log of previous 5 no's of Fault		
Relay Output Type	Configurable :Fail safe-Yes (De-Energise to trip) (Default : Yes)  No (Energise to trip - Non fail safe) (Applicable for shunt trip coil		
Timing Function			
Power ON Delay Setting	1sec to 999sec (Default : 5sec)(750ms Hardware initialization delay)  If power on delay set to 0sec then ON delay time will be applicable to respective relay.  Note: Power ON Delay is not applicable for Non fail safe mode.		
Off Delay Setting	0.1 to 999sec (Default : 5sec) Configurable for faults UV, OV, UF, OF & Asymmetry. Phase rev./3 ph interruption: <100ms, High/Low cutoff: <200ms, Neutral Loss: <500ms. Phase fail: <100ms (In non fail safe mode phase fail duration is <500ms).		
On delay setting	0.5 to 999 sec (Default :5sec)		
Mechanical Parameter	r:		
Operating Mode	Continuous Operation		
Degree of Protection	IP-20 for Enclosure & Terminals, IP-40 with Front Facia for Dust cover		
Housing	UL94-00		
Mounting	Base/Din		
Dimension (WxHxD)	36 x 90 x 66.5 mm		
Weight	132 g Approx.(Unpacked)		
Approval	CE & RoHS		

Connection :	
Connection	Eurostyle Wire Terminal Connector
Wire size	1 x 2.5 sq. mm. (24 to 12 AWG)
Stripping Length	7-8 mm
Screw Tightening Torque	0.5 Nm / 4.4 lb.in.

## Compliance with Standards EMI/EMC:

Standard	IEC 60255-1		
Harmonic Current Emission	IEC 61000-3-2	CLASS A	
Voltage Flicker and Fluctuations	IEC 61000-3-3	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 IV	
Conducted Susceptibility	IEC 61000-4-6	LEVEL III	
Voltage Dips and Interruptions (AC)	IEC 61000-4-11		
Voltage Dips and Interruptions (DC)	IEC 61000-4-29		
Conducted Emission	CISPR 11	CLASS A	
Radiated Emission	CISPR 11	CLASS A	

Safety:				
Test Voltage Between I/P & O/P	IEC 60947-5-1	2KV		
Test Voltage Between all Terminals & Enclosure	IEC 60947-5-1	2.5KV		
Impulse Voltage Between I/P & O/P	IEC 60947-5-1	4KV		
Insulation Resistance	UL508	>50KOhm		
Leakage Current	UL508	<3mA		
Single Fault	IEC 61010-1			
Pollution Degree	II			

Environmental:	
Operating Temperature	-10°C to + 60°C
Storage Temperature	-20°C to + 70°C
Cold Heat	IEC 60068-2-1
Dry Heat	IEC 60068-2-2
Vibration	IEC 60068-2-6 5g (10 - 50Hz)
Relative Humidity	95% RH (Without condensation)
Max. Operating Altitude	2000 meters

### **CONNECTION DETAILS:**

DMS110	DMS120	DMA220
R Y B N Ø Ø Ø Ø D D D D D D D D D D D D D D D	R Y B N Ø Ø Ø Ø D D D D D D D D D D D D D D D	R Y B N
L1 L2 L3 N	L1 L2 L3 N	L1 L2 L3 N
© GIC		
15 16 18	15 16 18 25 26 28	15 16 18 25 26 28
15 6 6 16 18	15 25	15 d 25

# **DIGITAL SUPPLY MONITORING RELAY** Series SM 800

# **Ordering Catalog Nos.:**

**DMS110 DMS120**  **DMA220** 



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#### 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.

- Monitor under-over voltage & frequency in 3 phase systems for line/Phase voltage.
   Monitoring of phase loss, phase sequence, Phase asymmetry & neutral fail.
   Measure true RMS AC voltage.

- Self & auxiliary power devices. Configurable Power on delay, off delay & On delay. Faults can be individually Enable/Disable for individual relays. Configurable output contact for Energise to trip & De-energise to trip.
- Relay Latch mode can be individually Enable/Disable (Manual / Auto mode).
   Digital LCD display for real time monitoring.
   Instantaneous faults can be viewed on LCD window.
- Stores last five fault history
- Backlit functioning is based on Fault & Relay status. Configurable backlit.
- Password protection
- Sealable transparent dust cover.
- Din rail/Base mount. CF & RoHS compliance

### **A** 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.
   Device should be kept away from wet, dust & humidity environments.
   Device manufacturer will not be responsible if any incident occur due to negligence of cautions.

### **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.

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

# **FUNCTION DESCRIPTION:**

A. Voltage Asymmetry: If measured asy. exceeds asymmetry threshold then device will declare it as

Note: Due to locking between threshold & hysteresis, in case of absolute asymmetry, maximum value of hysteresis will be less than equal to -8V of asymmetry threshold while incase of % asymmetry, maximum value of hysteresis will be less than equal to -4% of asymmetry threshold.

#### • Percent Asymmetry :

Find out max line voltage ,  $\min$  line voltage and average line voltage

Calculate two differences as D1 and D2 :

D1 = Max line voltage - Average line voltage & D2 = Average line voltage - Min line voltage % Asymmetry Calculation:

if (D1 > D2) then D = D1 otherwise D = D2.

% Asymmetry =  $(D / Average) \times 100$ .

## Absolute Asymmetry :

Find out max line voltage and min line voltage .

Absolute Asymmetry = Max line voltage - Min line voltage.

B. Neutral Fail: In run time or at power on, if neutral connection open then device detect it as Neutral fail fault.(Applicable to 3P-4W only).

C. On Delay: On delay is time duration between fault recovery and relay action. ON delay is applicable for recovery of all type of faults.

Note: If fault occur again during ON delay, then device reload ON delay.

**D.** Off Delay: OFF delay is time duration between fault detection and relay action.

E. Mode: Each relay mode can be configure as Auto or Manual (Latch). At this time of fault recovery , Auto mode relay recovers automatically. However Manual mode relay require to press Reset key for recovery

F. History: History saving is done when any relay is tripped by any fault. Eg. If multiple faults are present while tripping then history will be logged for only one fault for which the relay has tripped first. In history saving total last five faults are logged in the data flash memory including Relay  $1\ \&\ 2$ . If multiple faults occurs on same instant then it will log only one fault due to which it was tripped.

**G.** During power fail and interruption fault, Non-fail safe relay state does not change, hence no fault displayed.

## H. Critical Faults :

Interruption, Neutral Fail, High cut-off & Low cut-off faults are critical faults hence for application safety in the event of any of these faults both relay are immediately tripped irrespective of their setting.

> MLI 055-07 w.e.f. :05/02/2024

