

Universal 3 Phase Voltage Monitor DLMU Series (DPDT) Motor Protector



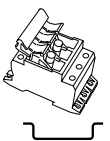
ANSI Device #27/47/59



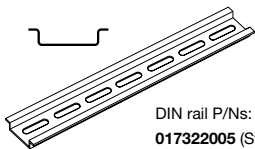
- Protects Against: Phase Loss, Phase Reversal, Over, Under and Unbalanced Voltages, Over/Under Frequency
- 35 mm DIN Rail or Surface Mounting
- DPDT Isolated 10 A Relay Contacts
- LED Indicates, Relay, Faults, & Time Delays
- Universal Line Voltage 240 ... 480 V AC in One Unit
- 600 V AC Version Available
- 3 Wire Connection for Delta or Wye Systems
- ASME A17.1 rule 210.6
- NEMA MG1 14:30, 14:35
- IEEE C62.41-1991 Level B

Approvals:

Accessories



3-phase fuse block/disconnect
P/N: **P0700-241**
2 Amp Fuse
P/N: **P0600-11**



DIN rail P/Ns:
017322005 (Steel)
C103PM (Al)

See accessory pages for specifications.

Description

Preliminary Data Sheet - Available 2nd Quarter 2007

The DLMU Series is a universal voltage, 3 Phase Voltage Monitor. It continuously measures the voltage of each of the three phases with microcontroller accuracy and compares the value to preset trip points. It separately senses Phase Reversal, Over, Under and Unbalanced voltages including Phase Loss and over or under frequency. Protection is assured during periods of large average voltage fluctuations, or when regenerated voltages are present. The unit trips within 200 ms when phase loss is detected. Adjustable time delays are included to prevent nuisance tripping and short cycling of sensitive equipment. The 10A isolated DPDT output relay contacts trip when a phase voltage exceeds the trip limits for the trip delay. Nominal line voltage, voltage unbalance, and time delays are knob adjustable. The phase loss set point and the acceptable frequency range are fixed. Both Delta and Wye systems can be monitored; no connection to neutral is required.

Operation

Upon application of line voltage, the output is de-energized and the restart delay begins. If all the three phase voltages are within the acceptable range, the output energizes at the end of the restart delay. The microcontroller circuitry automatically senses the voltage range, and selects the correct operating frequency (50 or 60hz). The over and under voltage trip points are set at +/- 10% of the adjusted line voltage. When the measured value of any phase voltage exceeds the acceptable range limits (lower or upper) the trip delay begins. At the end of the trip delay the output relay de-energizes. If the phase voltage returns to an acceptable value before the trip delay expires, the trip delay is reset and the output remains energized. Under, over, and unbalanced voltages plus over or under frequency must be sensed for the complete trip delay before the unit trips. The unit trips in 200 ms when phase loss or reversal are sensed. The unit will not energize if a fault is sensed as the line voltage is applied.

Reset: Reset is automatic upon correction of the voltage or frequency fault or phase sequence.

Restart Delay Options:

L= Lockout or minimum OFF time. The restart delay begins when the output trips. The unit cannot be re-energized until the restart delay is complete. This provides a minimum off time or lockout time to allow equipment sensitive to short cycling, time to reset. If the fault is corrected after the restart delay is complete the output energizes immediately. The restart delay also occurs when line voltage is applied/reapplied.

R= Restart Delay on fault correction. The restart delay begins when line voltage is reapplied or when a voltage fault is corrected. This option is normally selected when staggered restarting of multiple motors on a power system is required.

N= No Restart Delay. 0.6 second initialization delay on application of line voltage applies.

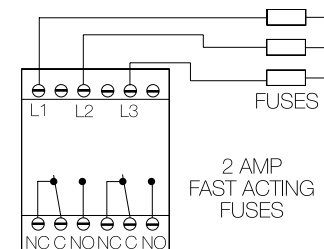
Restart Notes:

All restart options remain reset when the following conditions are detected:

- 1.) Phase Loss (phase unbalance greater than 25%)
- 2.) Average Line Voltage less than 120VAC
- 3.) Phase Reversal

The restart delay begins when the condition is corrected.

Connection



L1, L2, L3 = Line Voltage Input

NO = Normally Open Contact NC = Normally Closed Contact

C = Common, Transfer Contact

CAUTION: 2 amp max. fast acting fuses are recommended to protect the equipment's wiring. They are not required to protect the DLMU.

LED Operation

The LED flashes green during the restart delay, then glows green when the output energizes. It flashes red during the trip delay then glows red when the output de-energizes. It flashes red/green if phase reversal is sensed. If a fault is sensed during the restart delay, the LED will glow red during that portion or the full restart delay.

LED Flashing Table

Trip Delay	Red	ON/OFF	120 FPM
Restart Delay	Green	ON/OFF	60 FPM
Phase Reversal	Red/Green	Alternate	120 FPM
FPM = Flashes per minute			

Ordering Table

Series	Line Voltage	Output	Restart Function	Voltage Unbalance	Trip Delay	Restart Delay
DLM	X	X	X	X	X	X
-U	200 ... 480 V AC	-D	-L - Lockout, Min Off Time	-A - Adjustable 2 ... 10% Fixed: Specify Unbalance	-A - Adjustable 1...30s Fixed: Specify delay	-A - Adjustable 0.6 ...300 s
-H	500 ... 600 V AC		-R - Staggered Restarting -N - No Restart Delay	2...10% in 1% increments using two digits [04]	1...30 s in 1 s increments, using two digits [20]	-N - No Restart Delay

Example P/N:

- DLMUDLAAA** = 200 ... 480 V, DPDT, Lockout Function Delay, Adjustable Unbalance, Trip and Restart Delay
- DLMUDRAAA** = 200 ... 480 V, DPDT, Restart Delay on fault correction, Adjustable Unbalance, Trip and Restart Delay
- DLMUDNAAN** = 200 ... 480 V, DPDT, No Restart Delay, Adjustable Unbalance and Trip Delay
- DLMUDL0420A** = 200 ... 480 V, DPDT, Lockout Function, 4% Unbalance, 20 s Trip Delay, Adjustable Restart Delay

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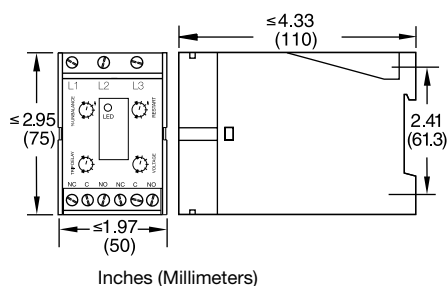
Voltage
Monitors

Technical Data

Line Voltage		3 phase Delta or Wye with no connection to neutral			
Type		Range	Voltage Adjustment Range	Line Frequency	Line Voltage Max.
Operating Voltage	200 ... 480 V AC	240	200 ... 240 V AC	50 or 60 Hz	
		380	340 ... 420 V AC	50 Hz	
		480	400 ... 480 V AC	60 Hz	550 V AC
	600 V AC	600	500 ... 600 V AC	50 or 60 Hz	600 V AC
Line Frequency		50 or 60 Hz Automatically detected			
Phase Loss		≥ 25% Unbalance			
	Response Time	≤ 200ms			
Undervoltage and Voltage Unbalance		Voltage detection with delayed trip & automatic reset			
Type		109 to 113% of the adjusted line voltage			
Overvoltage:	Trip Voltage	≅ -3% of the trip voltage			
	Reset Voltage	88 ... 92% of the adjusted line voltage			
Undervoltage:	Trip Voltage	≅ +3% of the trip voltage			
	Reset Voltage	Adjustable 2 ... 10%; or specify fixed unbalance of 2 ... 10% in 1% increments			
Voltage Unbalance:	Trip Set Point	≅ -0.7% Unbalance			
	Reset on Balance	Over/Undervoltage, Voltage Unbalance, Over/Under Frequency			
Trip Delay	Active On	Adjustable from 1 ... 30 s; or specify fixed delay 1 ... 30 s in 1 s increments			
	Range	± 15%			
	Tolerance	Adjustable from 0.6 ... 300 s; if no restart delay is selected a 0.6 s initialization delay applies			
Restart Delay	Range	± 15%			
	Tolerance	± 4%; Reset ± 3%; 50 or 60 Hz			
Over/Under Frequency	Trip / Reset	A, B, C, L1, L2, L3			
Phase Sequence		≤ 200 ms			
Response Time -Phase Reversal & Phase Loss		Automatic			
Reset					
Output		Isolated Electromechanical Relay			
Type		Double pole double throw (DPDT)			
Form		10 A resistive at 240 V AC; 8 A resistive at 277 V AC; N.O-1/4 hp at 120 V AC; 1/3 hp at 240 V AC			
Rating		Mechanical -- 1 x 10 ⁶			
Life		Electrical -- (at 10 A) -- DPDT = 1 x 30 ³			
Protection		IEEE C62.41-1991 Level B			
Surge		≥ 2500 V RMS input to output			
Isolation Voltage					
Mechanical		Surface mount with 2 #8 (M4 x 0.7) screw or snap on 35mm DIN Rail			
Mounting		Note: 0.25 in.(6.35 mm) spacing between units or other devices is required			
Package		4.33 x 2.95 x 1.97 in. (110 x 75 x 50 mm)			
Termination		Screw terminals with captive wire clamps for up to #14 AWG (2.5 mm ²) wire			
Environmental		-40°C ... +60°C			
Operating Temperature		-40°C ... +85°C			
Storage Temperature		95% relative, non-condensing			
Humidity		≅ 8.6 oz (244 g)			
Weight					

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Mechanical View



Ambient Temp {Deg. C} DLMU output rating

