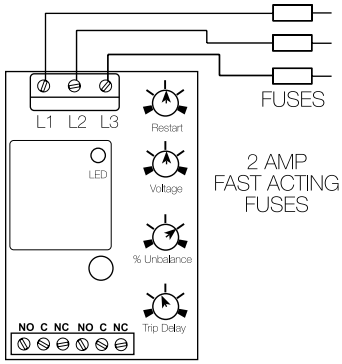
HLMU SERIES



Description

The HLMU Series is a universal voltage, encapsulated, 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 and loss; over, under and unbalanced voltages; 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 200ms when phase loss is detected. Adjustable time delays are included to prevent nuisance tripping and short cycling of sensitive equipment. The isolated, 10A, DPDT 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 setpoint and the acceptable frequency range are fixed. Both delta and wye systems can be monitored; no connection to neutral is required.

Wiring Diagram



2 AMP
FAST ACTING
FUSES

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 HLMU.

NOTE: Relay contacts are isolated, 277VAC max.

Features & Benefits

FEATURES	BENEFITS
Proprietary microcontroller based circuitry	Constant monitoring to protect against phase loss, phase reversal; over, under, and unbalanced voltage; over and under frequency
Universal line voltage range	Flexibility to work in 200 to 480VAC applications
DIN rail (35mm) or surface mounting	Installation flexibility
LED indication	Provides diagnostics of relay, fault and time delay status
Encapsulated	Protects against shock, vibration, and humidity
Finger-safe terminal blocks	Meets IEC 61000 safety requirements

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 200ms 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,

Ordering Information

MODEL	OUTPUT	RESTART FUNCTION	VOLTAGE UNBALANCE	TRIP DELAY	RESTART DELAY
HLMUDLAAA	DPDT	Lockout, min off time	Adjust. 2 - 10%	Adjust. 1 - 30s	Adjust. 0.6 - 300s
HLMUDN0405N	DPDT	No restart delay	Fixed, 4%	Fixed, 5s	None
HLMUDNAAN	DPDT	No restart delay	Adjust. 2 - 10%	Adjust. 1 - 30s	None
HLMUDRAAA	DPDT	Staggered restart	Adjust. 2 - 10%	Adjust. 1 - 30s	Adjust. 0.6 - 300s

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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.

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.

Accessories



LPSM003ZXID (Indicating), LPSM003Z (Non-indicating) Fuse Holders
Littelfuse POWR-SAFE Dead Front holders provide optimum protection to personnel for Class CC and Midget-Style fuses. 600 VAC/DC



0KLK002.T Midget Fuse (2 Amp)
10 x 38 fast acting, high-interrupting capacity, current-limiting type fuse. 600 VAC/500 VDC



C103PM (AL) DIN Rail
35 mm aluminum DIN rail available in a 36 in. (91.4 cm) length.



P1023-20 DIN Rail Adapter
Allows module to be mounted on a 35 mm DIN type rail with two #10 screws.

Specifications

Line Voltage

Type 3-phase delta or wye with no connection to neutral

Operating Voltage
200 - 480VAC

Range	Voltage Adj. Range	Frequency
240	200-240VAC	50 or 60Hz
380	340-420VAC	50Hz
480	400-480VAC	60Hz

Line Voltage Max. 550VAC
AC Line Frequency 50/60 Hz automatically detected
Phase Loss ≥ 25% unbalance
Response Time ≤200ms

Undervoltage & Voltage Unbalance

Type Voltage detection with delayed trip & automatic reset

Overvoltage
Trip Voltage 109 - 113% of the adjusted line voltage
Reset Voltage ≅ -3% of the trip voltage
Undervoltage
Trip Voltage 88 - 92% of the adjusted line voltage
Reset Voltage ≅ +3% of the trip voltage
Voltage Unbalance
Trip Setpoint Adjustable 2 - 10% or specify fixed unbalance of 2 - 10% in 1% increments
Reset on Balance ≅ -0.7% unbalance
Trip Delay
Active On Over/undervoltage, voltage unbalance, over/under frequency
Range Adjustable from 1 - 30s or specify fixed delay 1 - 30s in 1s increments
Tolerance ± 15%
Restart Delay
Range Adjustable from 0.6 - 300s; if no restart delay is selected a 0.6s initialization delay applies
Tolerance ± 15%
Over/Under Frequency ±4%; Reset ±3%; 50/60 Hz
Phase Sequence A, B, C, L1, L2, L3
Response Time-Phase Reversal & Phase Loss ≤200 ms
Reset Automatic

Output

Type Isolated Electromechanical Relay
Form DPDT
Rating 10A resistive @ 240VAC; 8A resistive @ 277VAC; NO-1/4 hp @ 120VAC; 1/3 hp @ 240VAC
Life Mechanical - 1 x 10^6
Electrical (at 10A) - DPDT - 1 x 30^3

Protection

Phase Reversal/Failure ASME A17.1 Rule 210.6
Motors and Generators NEMA MG1 14:30, 14:35
Surge IEEE C62.41-1991 Level B
Isolation Voltage ≥ 2500V RMS input to output
Circuitry Encapsulated

Mechanical

Mounting Surface mount with one #10 (M5 x 0.7) screw
Note: 0.25 in.(6.35 mm) spacing between units or other devices is required
Dimensions **H** 76.7 mm (3.0"); **W** 50.8 mm (2.0"); **D** 41.7 mm (1.64")
Termination Screw terminal connection up to 12 AWG (3.3 mm^2) wire

Environmental

Operating/Storage Temperature -40° to 60°C / -40° to 85°C
Humidity 95% relative, non-condensing
Weight ≅ 3.9 oz (111 g)

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