Functional Description:

Thermistor Relay protects and controls motors and alternators fitted with PTC ther mistorsensors. Motor heating is directly measured by temperature sensors that are in corop orated in starter windings. This ensures a direct control in following, operating. Conditions: heavy duty high, switching frequence, single phasing, high ambient temperature and insufficient cooling. This really disconnects when probe resistance exceeds 3.6 k Ω ± 5% and cannot reset until resistance lower then 1.6 k,±5% Auxiliary supply voltage should be applied to device between terminals A1-B2 to product ,connection. The relay trips through probe heating, resetting may be AUTO ,MANUAL or REMOTE.

SENSOR SHORT:

Probe cable short circuit is detected by device if resistance is lower then $20 \pm 4\Omega$ and resets when probe resistance is greater then $40 \ \Omega \pm \Omega 4$.

SENSOR OPEN:

Probe cable open Circuit detected by device if resistance is above $10k\Omega$ \pm and cannot reset until resistance is lower then 1.6 $k\Omega$ \pm 5 % The resistance at 25C0 of probe circuit must be with in 40 < 1.5 $k\Omega$ range.

AUTO RESET:

For Auto reset operation, keep Y1 and Y2 terminals open . Device will reset automatically when the total loop resistance of the series connected thermistors drops below 1.6 k Ω ±/5%.

MANUAL RESET:

For Manual reset operation , keep Y1 and Y2 terminals short. Device will reset manually by pressing RESET key of device when the total loop resistance of the series connected thermistors drops Below 1.6 k Ω $\pm/-5\%$.

REMOTE RESET:

For Remote reset operation connect a switch across Y1 and Y2 terminals, Device will be in Auto reset mode, if switch is open ,other wise device will be in Manual reset mode.

ADVANTAGE OF REMOTE RESET:

If fault occurs and recovers while the device is in Manual Reset mode, then user can put the device in Auto mode temporarily and switch ON the realy and Put the device back in Manual Reset mode, So, attending the decive can be avoided.

Connections for Mode Selection:



Overall Product Dimensions and Mounting Details: (in mm)



Connection Diagram:





Conformity to Standards:

EMC:

Product	IEC 60255	Ed. 1. (2005-12)
Harmonic Current Emission	IEC 61000-3-2	Ed. 3.0 (2005-11) Class A
ESD Immunity	IEC 61000-4-2	Ed. 1.2 (2001-04) Level III
Radiated Susceptibility	IEC 61000-4-3	Ed. 3.0 (2006-02) Level III
Electrical Fast Transients	IEC 61000-4-4	Ed. 2.0 (2004-07) Level IV
Surge Immunity	IEC 61000-4-5	Ed. 2.0 (2005-11) Level IV
Conducted Susceptibility	IEC 61000-4-6	Ed. 2.2 (2006-05) Level III
Voltage Dips and Interruptions(AC)	IEC 61000-4-11	Ed. 2.0 (2004-03) All 7 Levels
Voltage Dips and Interruptions(DC)	IEC 61000-4-29	Ed. 1.0 (2000-08) All 5 Levels
Conducted Emission	CISPR 14-1	Ed. 5.0 (2005-11) Class B
Radiated Emission	CISPR 14-1	Ed. 5.0 (2005-11) Class B

Safety:

Test Voltage between I/P and O/P	IEC 60947-5	Ed.3.0 (2002-12) 2 kV
Test Voltage between all terminals and	IEC 60255-5	Ed.3.0 (2003-12) 4 kV
enclosure		
Impulse Voltage between I/P and O/P	IEC 60947-5-1	Ed.3.0 (2003-11) Level IV
Single Fault	IEC 61010-1	Ed.2.0 (2001-02)
Insulation Resistance	UL 508	Ed.17 (1999-01)
Leakage Current	UL 508	Ed.17 (1999-01) <3.5 mA

Environmental:

Cold Heat	IEC 60068-2-1	Ed.6.0 (2007-03)
Dry Heat	IEC 60068-2-2	Ed.5.0 (2007-07)
Vibration	IEC 60068-2-6	Ed.7.0 (2007-12), 5 g
Repetitive Shock	IEC 60068-2-27	Ed. 4.0 (2008-02), 40 g, 6 ms
Non-Repetitive Shock	IEC 60068-2-27	Ed. 4.0 (2008-02), 30 g,15 ms

Function Diagram:



Technical Characteristics :

PTC Thermistor Rela	y Series - PD 225
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Cat. Nos.		МЈ81ВК	MJ91BK	МЈАЗВК		
Supply Characteristics:						
Supply Voltage (Un)		(110 to 240) VAC, (48 to 62) Hz	(220 to 440) VAC, (48 to 62) Hz	24 V AC/DC, (48 to 62) Hz		
Supply Tolerance			-20% to +10% of Un	1		
Power Consumption			3 VA		2 VA	
Relay O/P Characte	ristic	5:	1 -			
Contact Arrangement			1 C/O		2 C/O	
Contact Rating			6 A @ 250 VAC / 28 VDC		•	
Utilization Category	Ue ra	ated voltage V	120/240			
AC-15	Ie ra	ted current A	3.0/1.5			
Utilization Category	Ue ra	ated voltage V	24/125/250			
DC-13	Ie ra	ted current A	2.0/0.22/0.1			
Contact Material			Ag alloy			
Mechanical Life Expectar	псу		3 X 10 ⁶ operations			
Electrical Life Expectancy	/		1 X 10 ⁵ operations			
Feature Characteris	tics:					
Trip level			3.6 kΩ, +/- 5 %			
Reset Level			1.6 kΩ, +/- 5 %			
Sensor Short			< 20 \Omega, +/- 4 \Omega			
Hysterisis			$< 40\Omega, +/-4\Omega$			
Max Cold registance of c	oncord	hain	> 10 kΩ, +/- 5%			
Paget Selector		.11d111				
Reset Selector		Manual reset / Auto Reset / Remote Reset Selection.				
Manual Reset mode		Manual reset using RESET key				
Repeat Accuracy	Repeat Accuracy		<u>+</u> 1%			
Response Time	Ope	rate Time (OT)	~ 500 ms			
	Rele	ase Time (RT)	~ 100 ms			
	Rese	et Time	~ 150 ms		~ 200 ms	
LED Indications		Continuous ON	Power supply healthy			
	44	Continuous OFF	Power fail			
		Flashing	Sensor open			
		Continuous ON	Relay ON			
		Continuous OFF	Relay OFF			
	Flashing		Sensor Short			
Mounting / Dimensions (W X H X D)		Base Or / Din-Rail / (22.5 X 83 X 100.5)				
Weight (Unpacked)			~ 120 g			
Certifications	Certifications		CE, RoHS, IEC 60255 Ed. 1 (2005-12)			
Ambient Conditions:						
Operating Temperature	Operating Temperature		-15 °C to +60 °C			
Storage Temperature		-25 °C to +80 °C				
Relative Humidity		95% (without condensation)				
Operating Position		Any				
Maximum Operating Altitude		2000 m				
Degree of Protection		IP 40 (Enclosure); IP 20 (Terminals)				
Pollution Degree		2				

(ϵ)	RoHS 🖌

Cat. Nos. MJ81BK MJ91BK MJA3BK

1.Always follow instructions stated in this product leaflet.

2.Before installation, check to ensure that.3.the specifications agree with the intended application.

4.Installation to be done by skilled electrician.

5.Automation and control devices must be Automation and control devices must be against any risk of involuntary actuations.

6.Suitable dampers should be provided in the event of excessive vibrations.

Note: Product innovation being a continuous process, we reserve the right to alter specifications without any prior notice.

Features:

•Operable in various supply voltage conditions By selecting proper model.

• Various mode selection like AUTO, MANUAL, And REMOTE RESET.

•SPDT / DPDT Relay output.

•LED indications for healthy, unhealthy, Sensor open / short conditions.

•DIN Rail & Base Mounting.

Terminal Details:

Ø3.54.0mm	0.6 N.m (6 Lb.in) Terminal Screw - M3
	1 x 16 mm² Solid Wire / Single Wire Ferrule
	2 x 0.52.5 mm ² Insulated Twin Wire Ferrule
AWG	1 x 20 to 10

Technical Characteristics:

Cat Nos				MIBABK	MLC4BK	
Cat. Nos.			MLD4DK	MILC4DK		
Supply Voltage (Up)	>			2 Db 2 14/ima	2 Dh 2 Wing	
Supply voltage (Un)			3 Pn - 3 Wire 380 VAC - 480 VAC	3 Ph - 3 Wire 380 VAC - 480 VAC		
				(47-53) Hz	(58-62) Hz	
Supply Tolerance				-20% to +10% of Un		
Power Consumption						
Relav O/P Characteris	stics			12 14		
Contact Arrangement				2 Relays with 1 NO		
Contact Rating				6A@250 VAC / 28 VDC		
Utilization Category	Ue ra	ated voltage	V	120/240		
AC-15	Ie ra	ted current	Ă	3.0/1.5		
Utilization Category	Ue ra	ated voltage	V	24/125/250		
DC-13	Ie ra	ted current	Ă	2.0/0.22/0.1		
Contact Material	-			AgSnO ₂ alloy		
Mechanical Life Expect	ancy			3 X 10 ⁶ operations		
Electrical Life Expecta	ncy ,			1 X 10 ⁵ operations		
Feature Characteristic	ŝ			,		
Trip level				3.6 kΩ. +/- 5 %		
Reset Level				1.6 kΩ, +/- 5 %		
Sensor Short				< 20 Q, +/- 4 Q		
Hysterisis				$< 40 \Omega, +/-4 \Omega$		
Sensor Open				> 10 kΩ, +/- 5%		
Max. Cold resistance of	fsensor	chain		<1.5 kΩ		
Reset mode				Auto/Manual		
Repeat Accuracy				± 1%		
Response Time	Ope	Operate Time (OT) Release Time (RT)		< 500 ms		
	Rele			~ 100 ms		
	Rese	et Time		~ 150 ms		
LED Indications		Continuous ON		Power supply healthy		
	Ē	Continuous	OFF	Power fail		
		Flashing		Sensor open		
		Continuous	ON	Thermistor Relay ON		
		Continuous	OFF	Thermistor Relay OFF		
		Flashing		Sensor Short		
	(€))	Continuous ON	ON	Phase Sequence Relay ON		
	(**)	Continuous OFF		Phase Sequence Relay OFF		
Terminal Capacity				(1 to 4) mm ²		
Torque				0.6 N-m		
Mounting / Dimensions	(WXH	X D)		BASE / DIN-RAIL / (36 X 60 X 90) mm		
Weight (Unpacked)				~ 120 g (approx.)		
Certifications		CE, RoHS, IEC 60255 Ed. 1 (2005-12)				
Ambient Conditions						
Operating Temperature			-15 °C to +60 °C			
Storage Temperature				-25 °C to +80 °C		
Relative Humidity				95% (without condensation)		
Operating Position				Any		
Maximum Operating Altitude			2000 m			
Degree of Protection			IP 40 (Enclosure); IP 20 (Terminals)		
Pollution Degree			2			

PHASE SEQUENCE & THERMISTOR RELAY Series: PD 225

Cat. Nos. MLB4BK MLC4BK



Note: Product innovation being a continuous process, we reserve the right to alter specifications without any prior notice.

Caution:

- 1. Always follow instructions stated in this product leaflet.
- 2. Before installation, check to ensure that the specifications agree with the intended application.
- 4. Installation to be done by skilled electrician.
- Automation and control devices must be installed properly so that they are protected against any risk of involuntary actuations.
- 6. Suitable dampers should be provided in the event of excessive vibrations.

Features:

- LED indications for healthy, unhealthy, Sensor open / short conditions, Phase reverse conditions.
- Trip by phase reverse or temperature.2 independent SPST Relay output.
- AUTO/MANUAL RESET MODE selection for thermistor.
- DIN RAIL and Base mounting.

MLL027-00-002

Functional Description:

3 Phase Functionality:

Product is designed to detect phase sequence in three phase power system. When phase sequence of three phase is correct (L2 with 120° lag with respect to L1 and phase L3 with 120° lag with respect to L2), then relay connection between terminals 25 and 28 closes. Otherwise contacts are open.

Thermistor Functionality:

Thermistor Relay protects and controls motors and alternators fitted with PTC thermistor sensors. Motor heating is directly measured by temperature sensors that are incorporated in starter windings. This ensures a direct control in following operating conditions: Heavy duty, high switching frequency, single phasing, high ambient temperature and insufficient cooling. Relay connection between 15 and 18 disconnects when probe resistance exceeds 3.6 kΩ, ± 5% and cannot reset until resistance lower than 1.6 kΩ, ± 5%. Auxiliary supply voltage should be applied to device between terminals L1-L3 to produce connection.

SENSOR SHORT: Probe cable short circuit is detected by device if resistance is lower than 20 Ω , $\pm 4 \ \Omega$ and resets when probe resistance is greater than 40 Ω , $\pm 4 \ \Omega$.

SENSOR OPEN:Probe cable open circuit is detected by device if resistance is above 10 k Ω , ± 5% and cannot reset until resistance is lower than 1.6 k Ω , ± 5%. The resistance at 25°C of the probe circuit must be Within 40 < Resistance < 1.5 k Ω range.

AUTO RESET: For AUTO Reset operation, keep pot position on AUTO. Device will reset automatically when total loop resistance of series connected thermistors drops below 1.6 k Ω $\pm5\%$.

MANUAL RESET: Manual reset can be reached by keeping the pot on MANUAL. Device will reset manually by changing pot position to AUTO. When the total loop resistance of series connected thermistors drops below 1.6 k\Omega \pm 5%.

Connection Diagram:



Overall product dimensions and mounting details: (in mm)



Conformity to Standards:

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Product	IEC 60255 Ed.1 (2005-12)
Harmonic Current Emission	IEC 61000-3-2 Ed. 3.0 (2005-11) Class A
ESD Immunity	IEC 61000-4-2 Ed. 1.2 (2001-04) Level II
Radiated Susceptibility	IEC 61000-4-3 Ed.3.0 (2006-02) Level III
Electrical Fast Transients	IEC 61000-4-4 Ed. 2.0 (2004-07) Level IV
Surge Immunity	IEC 61000-4-5 Ed. 2.0 (2005-11) Level IV
Conducted Susceptibility	IEC 61000-4-6 Ed. 2.2 (2006-05) Level III
Voltage Dips and Interruptions(AC)	IEC 61000-4-11 Ed. 2.0 (2004-03) All 7 Levels
Conducted Emission	CISPR 14-1 Ed. 5.0 (2005-11) Class A
Radiated Emission	CISPR 14-1 Ed. 5.0 (2005-11) Class A
Safety_	
Test Voltage between I/P and O/P	IEC 60947-5 Ed.3.0 (2002-12) 2 kV
Test Voltage between all terminals and enclosure	IEC 60255-5 Ed.3.0 (2003-12) 4 kV
Impulse Voltage between I/P and O/P	IEC 60947-5-1 Ed. 3.0 (2003-11) Level IV
Single Fault	IEC 61010-1 Ed. 2.0 (2001-02)
Insulation Resistance	UL 508 Ed. 17 (1999-01)
Leakage Current	UL 508 Ed. 17 (1999-01) <3.5 mA
Environmental	
Cold Heat	IEC 60068-2-1 Ed. 6.0 (2007-03)
Dry Heat	IEC 60068-2-2 Ed. 5.0 (2007-07)
Vibration	IEC 60068-2-6 Ed. 7.0 (2007-12), 5 g
Repetitive Shock	IEC 60068-2-27 Ed. 4.0 (2008-02), 40 g, 6 ms
Non-Repetitive Shock	IEC 60068-2-27 Ed. 4.0 (2008-02), 30 g, 15 ms

Function Diagrams: